S. HRG. 101-599

THE PRESIDENT'S PROPOSAL FOR MAGNETIC LEVITATION TRANSPORTATION

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES, TRANSPORTATION,
AND INFRASTRUCTURE

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

MARCH 9, 1990

Printed for the use of the
Committee on Environment and Public Works

U.S. GOVERNMENT PRINTING OFFICE

28-716 WASHINGTON : 1990

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

S321-23

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THE PRESIDENT'S PROPOSAL FOR MAGNETIC LEVITATION TRANSPORTATION

FRIDAY, MARCH 9, 1990

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON WATER RESOURCES,
TRANSPORTATION, AND INFRASTRUCTURE,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:02 a.m., in room 406, Dirksen Senate Office Building, Hon. Daniel Patrick Moynihan [chairman of the subcommittee] presiding.

Present: Senators Moynihan, Reid, and Graham.

OPENING STATEMENT OF HON. DANIEL PATRICK MOYNIHAN, U.S. SENATOR FROM THE STATE OF NEW YORK

Senator MOYNIHAN. A very good morning to our distinguished witnesses and our guests.

This morning, we have the first hearing in this session of the Congress on a subject the subcommittee has been concerned with now for quite an extended period, going back about five years. That is the subject of magnetic levitation transportation.

We had an event yesterday, the subject of which was mentioned in a transportation policy prepared for the Administration by the Department and released yesterday at a "photo op" in the White House. It was all the more welcome after years and years of silence and a seeming incapacity to come to some closure with respect to this technology.

The essential fact, if you wish to call it a fact, is that this was a mode of transportation technology that was invented and patented in the United States. The Department of Transportation had a brief involvement with it, and then in a manner which the Department does not seem to be able to retrieve from its memory bank, it dropped the subject.

At just the time that the subject was dropped on our side, it began to be developed by Japan and Germany. This has become a pattern, particularly in the case of Japan, of American technology and science being picked up and developed by others with consequences throughout the world.

The energy of the Japanese in this regard is quite striking. I make the point that as late as 1966, the Japanese were receiving subsidized loans from the World Bank as a developing nation. That whole onset is a quarter of a century during which that extraordinary energy has burst forth.

In Germany, there was an earlier set of experiments along this line. I think that the Germans would insist that it is their technology, not ours. In any event, it doesn't much matter. Once something is done, it is available anywhere.

The Germans have worked to a point of about a $1 billion government investment and have a functioning system. Some of us have been there.

General, is that the German system in that photo?

General KELLY. Yes, sir, it is.

Senator MOYNIHAN. That is now a model long since retired. They have now a double-decked, enormously impressive piece of machinery.

The Japanese have begun a whole new second generation of magnetic levitation work. They have just announced that they are spending $3 billion. I have a press release here. "Japan to spend $3 billion on Superconducting Maglev over next seven years."

Then, rather strikingly, they will begin an airport connector at Sapporo costing about $1 billion, which will be the first commercial Maglev service. This is an on-line fare box operation.

In this committee, we have been interested and have been holding hearings and have been happy to report that from the beginning, the Corps of Engineers and the distinguished Assistant Secretary of the Army, who is with us today, have seen this as an appropriate area of technological development and innovation and have hoped to be involved.

The Department of Transportation was very resistant. The Department of Transportation has been a dead agency in the last decade. It may be coming alive thanks to Ms. Chao. We shall see.

In any event, the Japanese are spending $3 billion on their third generation of vehicles. We have just proposed to possibly, maybe spend $10 million in the next fiscal year. That is a formula for industrial decline; there is no question about it.

As the Federal Government becomes a place of greater inconsequence, State governments rise to the challenge that the Founder's of the Constitution envisioned. Both in Nevada and in Florida, there are very specific engagements with issues of high speed transit of this kind.

Let me discontinue my discourse on how to lose from the point of view of the Federal Government, which should see the railroads as an issue. The Federal Government gave 17 percent of the land west of the Mississippi to railroads if they would get to California, but those days are over for the Federal Government—not for Nevada, nor yet Florida.

[Senator Moynihan's written statement follows:]

STATEMENT OF SENATOR DANIEL PATRICK MOYNIHAN

CHAIRMAN, SUBCOMMITTEE ON WATER RESOURCES, TRANSPORTATION AND INFRASTRUCTURE
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
HEARING ON INTERSTATE 2: THE PRESIDENT'S FISCAL YEAR 1991 PROPOSAL FOR MAGNETIC LEVITATION TRANSPORTATION
FRIDAY, MARCH 9, 1990, 10:00 AM

We are most pleased to welcome to the Committee today Deputy Secretary of Transportation Elaine Chao and Assistant Secretary of the Army for Civil Works Robert Page to testify on the President's proposal for magnetic levitation transportation. General Patrick Kelly, Director of Civil Works for the Corps of Engineers will also appear. We had hoped to have Dr. Thomas Larson, Administrator of the Federal Highway Administration, but he was unable to join us. We certainly expect to hear much more from the Federal Highway Administration about maglev soon.

Let me emphasize why. What we have been talking about, and what the President is now talking about - as he did when he announced his National Transportation Policy yesterday - could be the defining mode of transportation for the 21st century. We have the Interstate and National Defense Highway System. It is about built. The 1987 Highway bill finished all but the last few sections. We, of course, have a huge job to maintain the highways we now have - and we have not been doing enough. But beyond the very real needs to maintain current infrastructure, we must have a new mode. And that mode, it seems to us, and now it seems perhaps the President as well, should be maglev - Interstate 2.

Given the congestion on our nation's highways and our airways, something new must be done. The interstate highway system, begun in 1956, was the greatest public works project in the history of the world. We should not and cannot remake this system over again. Our new problems must be solved in a new way.

Nor can we build enough additional lanes of highway - one report said that the principal highways between West Palm Beach and Miami would have to be widened to a total of 44 lanes over the next decade or so to handle the traffic. Imagine, 44 lanes. Even if we could acquire the rights-of-way to build them - and we cannot -- is that what we would want? Russell Baker said it well; he wrote a column called "One of Our States is Missing". And it certainly would be were it to be paved with 44 lanes.

We think there is a better approach - and that is Interstate 2. Use the existing interstate rights-of-way to construct maglev guideways. They would be fast, up to 300 miles per hour is reasonable to expect. They would be convenient - maglev vehicles could be operated with close headways, and unlike airplanes they would not be subject to the weather. Best of all they would be energy-efficient and relatively non-polluting. At a time when we are debating a Clean Air bill we had better recognize that if we do nothing to reduce the amount of fossil fuels used, we will have done nothing to reduce the emissions. California tail pipe standards or not. Doing something means less cars and trucks on the roads - and maglev offers both a passenger and a freight capability.

The Maglev Technology Advisory Committee established by this Committee on September 28, 1988, and issued its first report on June 22, 1989, has shown that a U.S. maglev effort is, dare we say, almost a moral imperative. We can "leapfrog" the existing foreign technologies if we have the will. After all, the technology was invented by Drs. James Powell and Gordon Danby at Brookhaven National Laboratory in the 1960s. Dr. Henry Kolm and others at MIT did further groundbreaking work in the early 1970s. But then, of a sudden, in 1975, federal support, modest to begin with, was terminated. Nor did the private sector fill the vacuum.

In the meantime, the Japanese and the Germans have gone roaring ahead. They spent $1 billion each on prototype systems. They proved the technology works. The Japanese announced in January the construction of two new systems. A $2 billion new test track for a second generation maglev in the Tokyo-Osaka corridor to be done by 1997. And a $1 billion first generation revenue system from downtown Sapporo to its airport to operate by 1994.

The 1997 Japanese target for a "second generation" maglev is, perhaps not merely by coincidence, the same time frame that the MTAC recommended for the U.S. effort. Indeed, it is precisely this second generation system for which the MTAC concluded we have a chance to compete. The first generation Japanese system would have problems in adapting to the interstate rights-of-way. It now seems the Japanese have staked $2 billion on beating us in building a "leapfrog" technology. The President has recommended $10 million.

Perhaps we have already lost the race. If the Japanese establish a "patent fence" around the second generation technology in the next few years, while we continue with studies, we certainly will have done. And we will have lost the next mode of transportation. Mind, we will have maglev. It will just be made in Japan and Germany. But we will have lost something singular, our belief in our ability to lead the way to the future. And we will have failed our pioneers - Drs. Powell, Danby, Kolm and others.

I do not want that. And - one bright spot - nor, I believe, does the Director of the Office of Management and Budget. Let me recognize, after all, that it was the Director of the Office of Management and Budget, Mr. Darman, who played the critical role in seeing to it that the Administration now has a maglev policy.

And now let us hear of it.

Senator MOYNIHAN. Senator Reid, good morning, sir.

Senator REID. They didn't give away enough land in Nevada. The Federal Government still owns 87 percent of Nevada.

Senator MOYNIHAN. They did not give you the 17 percent? You are owed 4 percent of the land, sir.

OPENING STATEMENT OF HON. HARRY REID, U.S. SENATOR FROM THE STATE OF IOWA

Senator REID. Mr. Chairman, I congratulate you on holding this hearing for Maglev research and development among other things.

As we pointed out on this subcommittee on a number of occasions, in the early seventies, this Nation was well on its way to commercial development of Maglev technology. Abruptly on February 5, 1975, Federal R&D money for Maglev research dwindled away and simply took the United States out of the key technological race and ceded the field to the Japanese and to the Germans.

Mr. Chairman, thank you again for your efforts. It is because of your efforts that the Federal Government now seems willing to get back into the race. Maybe today should be recorded as February 6, 1975, instead of the date that it is today.

The President's budget proposal for almost $10 million for Maglev research and development is something that we are all interested in and happy about. While this amount is barely adequate for a serious effort, it is $10 million more than the Administration requested last year. If this latest effort is a serious one, and I believe that it is, then the time has come for Congress to prevent the OMB goon squads from summarily handicapping our Nation's ability to compete internationally in this crucial technology.

The private sector, crucial to the development of a Maglev system is also looking to the seriousness of this new effort. Without the enthusiastic private sector involvement, we will not have Maglev trains no matter how much money we ultimately dedicate to this effort.

Mr. Chairman, I have said it before and I will say it again: the Federal Government in the past has been involved in research and development of new technology. An example that I like to use and repeat is what happened with the telegraph.

In 1844, Congress and the President thought that maybe this technology that was being bantered about in Washington was worth looking into, so Congress appropriated $40,000 to build a telegraph line between Baltimore and Washington. For that $40,000 investment, the communications industry of the world, not only the United States, was revolutionized. After the initial $40,000 investment, the Federal Government stepped out of it and turned it over to the private sector.

Senator MOYNIHAN. We have a plaque over in the Congress where the terminal here was located.

Senator REID. Where is that plaque?

Senator MOYNIHAN. It's on the first floor of the Senate side, outside the Supreme Court Chamber. It is where the terminal was for the Washington end. Your facts are right and there is a plaque to prove it.

Senator REID. That's great.

So, I think that we made a real mistake when we terminated research and development for this program.

I guess we all recall the old saying, "Fool me once, shame on you; fool me twice, shame on me," and I think that perfectly encapsulates the current attitude of the private sector toward the latest efforts. I am not sure that they want to get involved until we prove that we are serious about helping with the research and development.

The speed at which events are progressing in the Maglev field are out of control. If this Nation does not act and act quickly, then we will never play a role in this technology, a technology that was invented here. We may be pouring the cement supports for the foreign trains.

I might say, Mr. Chairman, that I am happy to see Elaine Chao here as well as Secretary Page and General Kelly, but specifically Elaine Chao. I have found her office and that of the Secretary to be, as far as I am concerned, exemplary in Congressional/Administration relations. Their doors are always open and I have found them willing to listen to the problems we have in Nevada, part of which relate to the hearing here today.

I would ask, and I apologize for doing this, Mr. Chairman, but I have to go to a hearing that I am chairing.

Senator MOYNIHAN. You mentioned that to me on the floor last evening, sir.

Senator REID. I was wondering if, after Senator Graham gives his statement, I could ask about two or three questions?

Senator MOYNIHAN. You most assuredly can.

Senator REID. I hate to do that and I know it is out of order, but I would greatly appreciate it.

Senator GRAHAM. Mr. Chairman, if it would be agreeable, I would be pleased to have Senator Reid ask his questions now.

Senator MOYNIHAN. Why don't we do that. Senator Reid has to preside elsewhere.

Let me first formally welcome Secretary Chao to our hearing room. I don't think you have been here before. Your reputation certainly precedes you, as Senator Reid has said. Secretary Page and General Kelly are old friends and we welcome them, too.

If I may make one slight observation.

Senator REID. My hearing does not start until 10:30, so don't feel pressured.

Senator MOYNIHAN. With regard to OMB, I think that it would not only be ungracious, but possibly impolitic not to mention that it was Mr. Darman who got us our $10 million in the end.

Senator REID. If that's the case, we must strike from the record the phrase, "OMB goon squad."

Senator MOYNIHAN. Well, he had internal resistance, but he prevailed.

Senator REID. But he deserves it for other things he has done anyway.

Senator MOYNIHAN. That's right.

Senator, proceed, sir.

Senator REID. Ms. Chao, last month you came to Nevada for a transportation summit where all the Federal-elected officials, the Governor and various State and local officials were present. Would

you give me your observations as to the effectiveness of the summit as far as alerting the Federal Government as to some of the problems we have in the most rapidly growing part of the United States?

Ms. CHAO. Senator, first of all, thank you for the kind remarks. Your words mean a great deal to us because Secretary Skinner and I do place a great deal of importance on fostering a very cordial and responsive relationship with the Congress.

With respect to my visit to Nevada, as I mentioned to the press at that time, I was very impressed with the foresight that you had in convening a conference like that. The early morning helicopter ride that we took over the Spaghetti Bowl, which showed the early morning traffic congestion problems, was very enlightening. Then subsequently, the discussions held by the various State and local officials on the need to plan for transportation in the future was also very helpful.

I also had the opportunity to take a look at the People Mover project, which was very impressive in that it is a new 1.1 mile transportation system put together primarily with money from the private sector. Also, there is a great deal of attention focused on the transportation needs of the population and a real desire to get ahead of the problem and not let congestion overwhelm the local populace. From that point, again, I thought it was a very useful conference.

Senator REID. Thank you very much.

General, tell me what the Corps' attitude is toward the assignment that you have now been given regarding magnetic levitation.

General KELLY. We view it very positively, Senator Reid. We feel that with our past experience in handling technical issues and, particularly, our management of very large projects including research and development efforts, that a partnership between the Army Corps of Engineers and the Department of Transportation through the Federal Railroad Administration is probably a very natural partnership.

We have had some very good results in the last couple of months, as we are in fact putting that partnership together which both Secretary Page and Deputy Secretary Chao will discuss with you today. We see our role in helping FRA define the technical effort with, of course, FRA working on the market analysis and the financial aspects of the Maglev program.

Senator REID. It appears from the knowledge we have developed in this committee that the two jurisdictions that are doing the most toward developing a magnetic levitation system at this stage are Nevada and Florida.

Secretary Chao, you are, of course, aware of this. I would assume, in that there has been advanced work done—this question is particularly directed toward the Nevada/California corridor with magnetic levitation—you will direct sufficient attention to that in magnetic levitation development, is that right?

Ms. CHAO. Absolutely, Senator. I think that the proposed project, set up by the Bi-State Commission on this rail option between Las Vegas and Anaheim is really very exciting. We are monitoring it carefully, and looking forward to participating in an appropriate

manner. This has been a very new interest, I think, since the tenure of Secretary Skinner.

Senator REID. I have other questions that I will be submitting to the witnesses for written responses; with your permission, Mr. Chairman.

Senator MOYNIHAN. Please do. There has been no one as indefatigable as you in this matter, and we are showing some results, thanks to you. When morale declines in this part of the spectrum, we all look to you.

Senator REID. I am going to look forward to hearing from my staff regarding the rest of this hearing, and before the day is done, I am going to go find that plaque.

Senator MOYNIHAN. Thank you, sir.

We have a statement from Senator Symms who was unable to attend the hearing today. That will be made part of the record.

[The statement referred to follows:]

OPENING STATEMENT OF HON. STEVE SYMMS, U.S. SENATOR FROM THE STATE OF IDAHO

Mr. Chairman, I am pleased that this hearing has been convened to hear testimony regarding President Bush's 1991 budget proposal for Magnetic Levitation transportation, also known as MagLev.

With the release of the Administration's National Transportation Policy yesterday, the President called for a strong commitment to research and development of advanced transportation technologies into the 21st century. I believe magnetically levitated trains, intelligent vehicles and highways, advanced materials and engineering, and telecommunications all have enormous potential to improve the mobility of Americans as well as the movement of their products.

However, no single transportation mode will be able to meet the full range of all of our future transportation requirements. Although high-speed rail and MagLev are already operating in Europe and Japan, this technology has not yet been put into active commercial application in the U.S. More analysis will be needed to assess its feasibility, relative costs, applications and benefits.

America has a rich and proud history of scientific and technological breakthroughs in the transportation field that has permitted worldwide advances in various industries and societies. Future transportation research, innovation, education and technological expertise will be an important aspect in preparing for the mobility needs of the next century.

Mr. Chairman, America's future economic health depends on the long-range investments that are made today in our transportation infrastructure. I look forward to reviewing today's testimony regarding the possibility of a MagLev program in the United States.

Senator MOYNIHAN. Senator Graham.

OPENING STATEMENT OF HON. BOB GRAHAM, U.S. SENATOR FROM THE STATE OF FLORIDA

Senator GRAHAM. Mr. Chairman, I do not have a prepared opening statement but I would like to make a couple of observations, one looking backward and the other looking forward.

To me, a very fundamental issue is: what will the Federal role be in transportation policy in America? It is interesting that so much of our Nation's history has revolved around that question.

One of the reasons that the Articles of Confederation were found to be inadequate was their inability to deal with a transportation system that would bind the Thirteen Colonies together. One of the first sets of political issues, once the Constitution was adopted, was the question of what should be the Federal role in the development of a federally financed transportation system, much of which was canals in our Chairman's State.

Senator MOYNIHAN. Internal improvements, yes.

Senator GRAHAM. Frankly, I am concerned not about the block letter headline of the report issued yesterday by the Secretary, which is very good, but rather by the substance beneath the headline which seems to me to be characterized as a significant Federal retreat from a national responsibility for transportation policy.

I would hope that perhaps during the course of this hearing today, we could see whether we are going to be faithful to our national history of the Federal Government's key role in national transportation policy, particularly where we are breaking new ground, whether that is building railroads to the West, opening up commercial aviation in this century, or now preparing for the 21st century, or whether the national government is essentially going to be sitting in the cheap seats of the grandstand applauding in hopes that we can stimulate other people to actually get out on the field and play the game.

The second concern that I have, Mr. Chairman, is: what is the analogy of high speed rail and magnetic levitation? One of the first lessons in a business school curriculum is a discussion that was asked of the American railroad industry at the end of the 19th century, "What business are you in?" The answer of the American railroad industry was, "We are in the railroad business."

That consigned most of the companies whose executives answered the question in that manner to bankruptcy. They had the alternative of answering the question, "We are in the transportation business," and with that broader definition, they could then have moved into trucking, aviation, all the new emerging forms of transportation and would probably have had a much happier 20th century than most railroad companies in fact endured.

I am concerned that we are defining magnetic levitation as essentially an extension of trains. The General indicated that they are working with a unit within the Department of Transportation which is one of the units that has the word "train" in it. I really believe that is a misdefining of what we are dealing with and could be a misdefining with very serious negative implications.

I believe that, if anything, what we are most analogous to here is intercity aviation. The technology of this type of vehicle is going to draw more on aviation technology than on traditional train technology.

The competitive alternative for this train is going to be more aviation than it will be trains. There are no trains of any significance, for instance, providing passenger service in my State. What the high speed rail is going to do is to reduce the number of aviation movements within our State.

Finally, the organizational structure between the private sector and the public is going to be, I think, quite similar to the relationship between an aviation authority providing the basic facility and financing and the private airline whose commitment to landing fees and gate rentals provides the support base and then the actual equipment and personnel to operate the system. That is likely to be the public/private organizational relationship that will make high speed rail functional in the United States.

I would just caution that we not wrap ourselves in "old think" as to what it is we are doing here. This is not an 18th century technol-

ogy brought up to the 21st century. We really are breaking new ground in terms of what we are attempting to do here. What better place could there be for an imaginative, innovative, and constructive national transportation policy than to break its new ground in new thinking on this exciting project?

Senator MOYNIHAN. Thank you, sir.

On that very necessary and positive note, why don't we turn to Secretary Chao. We will place your testimony, and all testimony into the record. If you would like to read it, do so, and if you wish to proceed at your own pace, do that. Welcome.

STATEMENT OF HON. ELAINE CHAO, DEPUTY SECRETARY, DEPARTMENT OF TRANSPORTATION, ACCOMPANIED BY DEAN CARLSON, EXECUTIVE DIRECTOR, FEDERAL HIGHWAY ADMINISTRATION

Ms. CHAO. Thank you very much, Senator.

Senator Graham, I thought your comments were right on target.

Mr. Chairman, I do have a prepared statement that I will submit for the record and will read a condensed version.

Senator MOYNIHAN. Take your time; we have plenty of time.

Ms. CHAO. I would also like to respond to Senator Graham's comments before I start.

Senator Graham, I do not think that you will find those of us at the Department of Transportation at variance with your comments. In fact, I think we very much support your comments.

Clearly, we view the U.S. transportation system as an integral part of this country's vital need to be competitive overseas. Not only is it a movement of people and goods domestically, but our efficiency in doing so will contribute greatly to our competitiveness in overseas markets.

Delays are costly. Congestion in our highway system and our airways system is costing the American consumer and American businesses a great deal of money in lost productivity and reduced quality of life; monies and energies which could be better channeled to more pressing needs.

You mentioned another very good point about Maglev not being viewed just as a train. Again, we are in total agreement with you. If there is one theme that Secretary Skinner has emphasized since coming on board, it is that we are an intermodal transportation department.

We are not in the business of promoting trains, airplanes, or highways. Rather, we are trying to provide efficient, coordinated, and safe transportation travel for the American public. Maglev offers a very interesting potential option to alleviate the congestion that we are now facing in our skies and highway system.

One thing I must say is that we do not view rail travel or potential Maglev travel as taking passengers away from the airlines. With the events of the last eight years, our public is much more mobile. Air passenger volume and commuting volume has increased dramatically we are seeing a tremendous increase in the numbers of travelers using our transportation system.

Clearly, Maglev and other high speed options would offer the American traveling public another alternative in addition to the airlines. Having more options can only be beneficial for Americans.

Also, your words on the private sector are very promising. I used to be a banker. In fact, I still consider myself a banker sometimes. The private sector is going to play a very large part in helping all government, Federal, State, and local, to plan this new transportation system.

With that, if I may, I will just quickly summarize my statement.

This is my first time before the Committee and I am really delighted to be here. I hope my presence demonstrates the Department of Transportation's emphasis on and excitement about one of the most interesting developments in transportation in recent years. That is Maglev high speed ground transportation.

With me today is Dean Carlson, the Executive Director of the Federal Highway Administration.

Senator MOYNIHAN. Mr. Carlson, we welcome you.

Ms. CHAO. As I mentioned, congestion on our highways and at our airports is constraining mobility to the point that economic growth may be severely impacted. Present conditions bode even more serious consequences for the future.

Maglev, with its safe operating speeds in excess of 300 miles per hour, offers an interesting potential to dramatically improve surface transportation mobility using a technology that is often heralded as energy efficient and also environmentally sound.

Let me say, Mr. Chairman, that numerous officials of the Department of Transportation have visited Emsland, West Germany to ride the prototype Transrapid Maglev system. I was there myself last October and met with its designer.

Mr. Chairman, Secretary Skinner is going to be going to Europe at the end of next week and he, too, will be traveling to Emsland, West Germany to ride on this system.

I have also met with the designers of the Japanese Railways prototype and also with some State and local officials in several States and with private investors who want to develop Maglev in the U.S. Basically, I came away from these meetings believing that this technology has the potential to play a very important role in our Nation's transportation system, not only in this decade but throughout the 21st century as well.

As the department responsible for the safety of the Maglev systems, DOT has initiated a major effort to ensure the safety of this new system. We are working with the developers of the system to ensure that safety standards and regulations are clear, and also that they are considered while the system design is developing. We want safety built into the system, not added later, as in the case with some projects, risking the possible disruptive effects.

At the direction of the Congressional Appropriations Committees, FRA is studying the feasibility of commercial Maglev in the U.S. That study will be completed in June of this year and will evaluate Maglev's potential in the market place, assess the economic and technical feasibility of commercial Maglev systems, and identify legislative and other institutional changes that would facilitate the development of this U.S. designed and manufactured system.

As you mentioned, the President's budget request for fiscal year 1991 includes a request for approximately $10 million. Building on previous research and development done by the Department and results of the current feasibility study, our program is designed to determine the role of Maglev in the U.S. transportation system. The goal of this program is to facilitate private development of an operational Maglev system in the U.S. based on a domestically designed and manufactured technology.

The FRA and the Department are also working with a committee called the Federal Maglev Executive Committee, in an effort to avoid duplication and to make sure that we are all pushing in the right direction. The Federal Maglev Executive Committee, chaired by the FRA Administrator and including Tom Larson, the Federal Highway Administrator, Major General Patrick Kelly, who is here today, and Michael Davis, Assistant Secretary for Conservation and Renewable Energy at the Department of Energy, will set policy for the effort. At the working level, the Federal Maglev Coordinating Committee is directing the implementation of this policy and coordinating all Federal Maglev efforts.

We believe that this process is working well. We also believe that combining the Corps' expertise in public works with the Department's expertise in transportation and in Maglev technology will lead to definitive analyses and recommendations on the future of Maglev in this country. As you know, these recommendations are to be completed in early 1992.

I would like to mention just a couple of other things. The group's first joint endeavor will be a government/industry forum to be held in May of this year to explain the Federal Maglev initiative, to involve and obtain private sector input, and to begin the development of government/industry relationships that will be necessary if this effort is to be a success.

I know, Mr. Chairman, that you are going to be addressing this gathering.

Senator MOYNIHAN. And also Senator Reid. Senator Graham is welcome also, of course.

Ms. CHAO. I know that they will very much appreciate your participation.

Basically, Maglev systems offer us an alternative that is less disruptive and possibly less expensive than the construction of new highways or airports. These projects are very exciting and we look forward to participating in them.

One more thing, if I may, Mr. Chairman. I was brought up in a religious home where we used to go to church all the time.

There was one Biblical verse that comes to mind here. If I can take liberty with that phrase and say that the sins of the fathers should not be visited upon the children.

Senator MOYNIHAN. What kind of church is that?

Ms. CHAO. You are seeing a new attitude in the Department of Transportation. We are very interested in being full players in this process. Secretary Skinner and I are fully involved. We understand that there might have been some miscommunication in the past. We understand that.

We just hope, again, that you will give us the opportunity to be full participants. We think you will be very pleased with our efforts.

Senator MOYNIHAN. That is very refreshing. I did not think that I would ever hear that.

We have been at this about five years and we kept asking the Department of Transportation if they would be interested in what seemed to us to be, very probably, what will be the defining mode of transportation, and they said, "Go away. We are in the railroad business. We are in the highway business. We are in the airline business. We are not in anything new." You almost wanted to convene a "Subcommittee on Cultural Decline."

The Department of Transportation is an example. Here is an institution that has failed. It could not do what it was clearly expected to do.

You cannot imagine the years of having them sit down there and say, "Huh?" And, "We got more highways and we're going to revive railroads. Well, no, maybe not revive them; that might cost something. But we'll preserve them or something."

Ms. CHAO. May I also say, Mr. Chairman, in response to Senator Graham's comments about intermodalism, we now have three surface transportation agencies, FRA, UMTA, and Federal Highways, whose administrators meet every week and coordinate very closely with each other. The traditional independence of the modal administrators is, I think, something of the past. We realize that we are planning for transportation systems of the future and must take into account integration among various modes of transportation.

Senator MOYNIHAN. More than that, you cannot ask.

The United States did not just lose its capacity for technological innovation in the space of 15 years. Fifteen years does turn out to be a lot of time, though. There is some science history in this in the amount of time it took between the discovery of a scientific principle and its application—150 years would be nothing in the beginning, but you are now down to 15 weeks, I suppose, somewhere in Osaka.

We are going to have an operation in Orlando, as your testimony says. The construction will begin as early as next year and would employ the German technology and be financed by Japanese banks. That tells you an awful lot. That has happened on the Department's watch.

I wrote a piece some time ago for "Scientific American," which is an old journal. It goes back to the 19th century. It was simply entitled, "How to Lose: the Story of Maglev," and there are patterns of decline.

[The article referred to follows:]

ESSAY

How to lose: the story of maglev

by Daniel Patrick Moynihan

This is the story of a contest almost no one is watching. At stake is preeminence in the production and sale of a revolutionary new mode of transportation. It is called magnetic levitation—maglev for short. It will define the coming century much as the railroad defined the last one and the automobile and airplane have defined this one.

Maglev is a combination railroad, automobile and airplane. A maglev vehicle is essentially a fuselage without wings that travels along a magnetized guideway at speeds up to 300 miles per hour. The principles behind it are well established.

The idea for maglev was thought up by Dr. James R. Powell on a Friday night in February, 1960, while he was stuck in that permanent traffic jam that awaits anyone trying to leave Long Island over the Bronx-Whitestone Bridge. Powell, a 28-year-old nuclear engineer at the Brookhaven National Laboratory on Long Island, figured you could exploit magnetism to both levitate and propel a vehicle along a guideway. Powell and Dr. Gordon T. Danby, a colleague at Brookhaven, presented the first paper on superconducting maglev transportation at an engineering conference in 1966, and the race was on.

At the start, of course, the U.S. was the only entrant. Development work began at M.I.T. under the guidance of Dr. Henry H. Kolm. By 1974 Kolm had developed a 1/25th scale model of a maglev vehicle he dubbed the magneplane. It moved millimeters above its aluminum track at 56 miles per hour. The federal government saw some promise in the idea. The High Speed Ground Transportation Act of 1965 provided funds for research and development of high-speed trains, air-cushion vehicles and, later on, maglev. Grants were awarded to Ford Aerospace and the Stanford Research Institute. We were on our way.

Then everything stopped. On February 5, 1975, a representative of the Office of Management and Budget announced that maglev research was no longer a priority. The budget would be juggled to shore up the past century's conventional rail technology. But by this time we were not alone in the race. Other countries had been quick to pick up on Powell and Danby's idea. By the late 1960's Great Britain, Japan, West Germany and—can you imagine?—Romania had initiated their own maglev programs. Japan and Germany have stuck at it.

By 1972 the Japanese had a model going; by 1979 they had tested a maglev vehicle at 320 miles per hour. The full-size German Transrapid 06 has traveled 100,000 miles on its 20-mile test track in Emsland. And these projects did not just happen. The Japanese government has poured $1 billion into maglev research, the West German government almost as much. By comparison, the U.S. government spent $3 million on maglev between 1966 and 1975; after that, nothing. Now the new secretary of transportation, Samuel K. Skinner, has said he is preparing a "national transportation plan" to be released early in 1990. If the U.S. is to make a commitment to maglev, this is the place to do it.

During its short history this country has experienced several transportation revolutions. Each of them has had a profound and irreversible effect on society.

The opening of the Erie Canal in 1825 began the great era of waterborne commerce. Canals provided convenient access to the interior and could carry cargo at a fraction of the cost of the horse and wagon. Thenceforth the federal government contributed substantially to the construction of the canal network.

Inexorably, canals were superseded by railroads, although not without some complaint. In 1829 New York's Governor Martin Van Buren wrote a strongly worded letter to President Andrew Jackson:

> As you may well know, Mr. President, "railroad" carriages are pulled at the enormous speed of 15 miles per hour by "engines," which in addition to endangering life and limb of passengers, roar and snort their way through the countryside, setting fire to the crops, scaring the livestock and frightening women and children. The Almighty certainly never intended that people should travel at such breakneck speed.

Nonetheless, by 1860 the canals were on the wane and the railroad was ascendant—again with federal help, this time in the form of massive land grants in the West.

Since that time the railroad has changed very little. Just last fall Amtrak proudly announced that its Metroliner had averaged 110 miles per hour on a special Boston to New York run—two miles per hour slower than the mark set by the Empire State Express No. 999 between Batavia and Buffalo in 1893! The Japanese Bullet train and the French TGV do a little better (operating speeds range from 150 to 180 miles per hour), but beyond this they will not advance. They have reached the upper limit for wheel-on-rail technology.

In the early years of this century the automobile quickly overwhelmed the railroad. By 1918 there were 6.2 million cars in the U.S. In what was perhaps the last great moment for the automobile, Congress enacted a highway bill in early 1987 to complete the Interstate Highway System. The Interstates, begun in 1956, have made up the largest public-works project ever undertaken, and their completion in the early 1990's will mark the beginning of the end of the Automobile Age. The Interstates, while still useful, will have become an idea of the past.

As for the airplane, it has served us well, but the air transportation system is already operating beyond the reasonable limits of its capacity. We can build more airplanes, and we can even build more airports (although we do not seem to be very good at this: no new major airport has opened since Dallas/Fort Worth did in 1974, even though passenger traffic has doubled). But try as we might, we cannot build more airspace. A finite amount of it is available over any given airport, and the airspace near many major cities is full to capacity.

The long and short of it is this: no major transportation revolution has ever progressed in the U.S. without substantial federal involvement. Maglev will be no exception. And if we do not build our own maglev system, we will end up buying it from others.

Fifteen years from now, when you settle into your seat for the one-hour run from Chicago to Detroit, have a look under your seat cushion. My sincere hope is that you will not find a small tag that reads "Maglev: invented by American scientists, made in West Germany."

DANIEL PATRICK MOYNIHAN is the senior U.S. senator from New York.

Senator MOYNIHAN. One of the first things I became involved with in Washington years ago was the question of what to do with a supersonic aircraft. President Kennedy asked then Vice President Johnson to head up a committee. He was in charge of the Space Committee.

I can't retrieve the energy of those meetings. Two o'clock in the morning in the Executive Office Building; it was Saturday already and you were going to go right through into Sunday if necessary to find out, "Should we do this?"

By contrast, we have the entropy of the last 15 years with that sort of, "Huh?" The nearest this subject has gotten to the Executive Office Building is Mr. Darman's coming in, in response largely to the "Scientific American" article.

One question I would ask, Madame Secretary, is it Ms. Secretary, Madame Secretary, or Secretary?

Ms. CHAO. Elaine will be fine, Senator.

Senator MOYNIHAN. Has the Department looked at its experience? Why did you drop this? I remember that I was so pleased. In 1969, we were about to open a new laboratory on the MIT campus to do work in nuclear research. The campus atmosphere was such that it just was not possible.

It was a big, interesting place, and I had the inspiration to say, "Why don't we give it to the Department of Transportation," and they took it. There they were, right at MIT in a big building.

Whatever happened to that building? It sort of disappeared, too, didn't it? The building is there, but you don't use it anymore, do you?

Ms. CHAO. No. I went to MIT in the spring of my year at Harvard. I studied international shipping at the Marine Engineering Systems Center. Regretfully, I did not have the opportunity to get involved in that aspect.

Senator MOYNIHAN. That is where the "MIT Bow" comes from. All those years, we tried to make those bows sharper and sharper so they would go faster, right? Wrong. Put a bulb out there. That is called the MIT Bow, developed there.

What happened to that research laboratory?

Ms. CHAO. We have tried to ask that as well.

Senator MOYNIHAN. What happened to it?

Ms. CHAO. I would be less than honest if I gave you an answer because, up to now, I do not think that Secretary Skinner and I have been satisfied with the answer.

Senator MOYNIHAN. Could I ask though? Would you tell this committee what happened? Something happened. Did anybody steal it? Did the Japanese steal our land?

They stole the plans of our battleship; I remember hearing that in the thirties. I didn't know at the time that the plans of a battleship would fill the Capitol Dome.

Ms. CHAO. Again, I would be glad to go back and try to reconstruct the history. It is difficult, but I would certainly do that.

If I could also address another point in response to what you mentioned about U.S. technology. Clearly, it is a tragedy that we have lost the technological leadership on this particular issue. In many ways, it is so symptomatic of what we are doing throughout the country in terms of new technology.

We are great with innovative ideas. America is teeming with new ideas, but somehow we lose the lead in marketing them. We develop the technology and then it is taken over by foreign governments.

With Maglev, as we look at the development of these different systems throughout the country, we should not be content with just a turnkey operation, but we should work with the vendors of these foreign technologies and somehow take a larger part in assuming the technological marketing of these future projects.

What often happens is that foreign technology comes in—it may be our technology imported from overseas—but the marketers come into this country and set up a turnkey operation. We go to the door, turn it on, the system works, and it seems wonderful.

Somehow, while we are developing our own U.S. technology or reclaiming it, we have to get in this marketing stream earlier. We need to learn to go with joint venture arrangements or some kind of licensing arrangements so that we get back into the game again.

Senator MOYNIHAN. Fair enough.

Two years ago, we received a report from a committee we had established three years ago on the benefits of magnetically levitated high speed transportation. This was done by engineers and scientists. They made the point that we had better hurry; that in about five years time, the operating generation, second or third as you like, of these models, would be surrounded by patent walls, and we would be able to have all that we were prepared to buy.

I guess, Madame Secretary, that you are suggesting that we are going to end up buying German or Japanese technology, but maybe we can get a better mix on our part. That is a tremendous failure.

If you think how central transportation modes are to civilizations, what a failure that is. It has, in effect, happened. Look at the pictures we see around here today. It is going to be Japanese bankers and German technology. That is stunning.

Mr. Secretary, we welcome you back, sir.

STATEMENT OF HON. ROBERT W. PAGE, ASSISTANT SECRETARY OF THE ARMY FOR CIVIL WORKS, DEPARTMENT OF THE ARMY

Mr. PAGE. Thank you very much, Mr. Chairman.

That was a very fine dissertation by Secretary Chao. I think she said a lot of the things that I would like to say.

Senator MOYNIHAN. She said some things that happen to be so, which was very refreshing from the Federal Government on this subject.

Mr. PAGE. I also have a statement for the record which I would like to submit.

Senator MOYNIHAN. Of course, sir.

Mr. PAGE. I also have a few brief comments.

First of all, I want to express not only a personal appreciation to you, but to all in the government and this nation who have so long seen ourselves wane in international competition and also have seen the drain of our research and development efforts away from this country. I can speak to that personally because, as you know, I have not been in the government for a long period of time.

I did head a large company that was involved in international work. I, as many heads of companies, had large research and development labs, and we saw ourselves losing our technology overseas because we were unable to compete in many ways with our friends in Japan, Korea, Italy, and France. There were certain amounts of subsidies involved in their research and development efforts.

Let me go back for a moment, if I may, to follow up on something that Senator Graham said. You are on the cutting edge here of a much larger effort. We laud you because you are looking at the infrastructure program, and we have to start with that program. This is a magnificent start.

I can remember back in 1972 and 1973—I was president of a company which built the ring accelerator at Fermilab in Batavia, Illinois. That ring accelerator happened to be the father of what we are now looking at as the large ring accelerator in Texas. That is also an offshoot—talking about what Senator Graham said a moment ago—of the broader picture of superconductivity, which is also part of the Maglev family.

In this country today, we have a tremendous technology capability. And it bothers me to see articles like the one in the "New York Times" about two weeks ago in which they gave a long story about the industry in Pittsburgh and how it was trying to gather itself together, to come to grips with this magnetic levitation program, and in doing so, how we would be taking on Japanese technology, German technology, Japanese and German equipment, or whatever from whomever was available.

We have the equipment and we have the technology. We now have the opportunity to encourage that to move forward on our basis.

Also, at one time, I served on the University of Houston's Board. I was chairman of their technology committee. It was there that we developed probably the most far-reaching part of the superconductivity program under Dr. Paul Chu. You have met Dr. Chu.

Senator MOYNIHAN. Yes, I have. You brought him around, sir.

Mr. PAGE. He is interested in being a part of this program and I think that rather than belabor this, I will just make the point that we do not need to look outside of this country for Maglev technology. We can look inside; we have it here.

Maglev is more than just transportation technology. It will have a very positive environmental effect on the nation. We look at this also from a national defense standpoint. As Chairman of the Panama Canal Commission, Mr. Chairman, I have spoken to you before on the vulnerable situation we have in Panama.

Senator MOYNIHAN. Of course we do.

Mr. PAGE. We are going to turn the canal over 10 years from now.

We are beginning to see a slight dropping off of that traffic. What is the alternative? I think that the transshipping industry in the United States is beginning to look at intermodal systems. Two examples are Seattle-Tacoma and Los Angeles-Long Beach.

How do you make that system work better? I think that one of the answers is, of course, Maglev, moving people and freight across this country faster and cheaper than we are doing today, and possibly faster and cheaper than we could do in the Canal.

Mr. Chairman, I drifted away from the remarks that I had, but I wanted to address several comments that were said here earlier.

Senator MOYNIHAN. That is a very important statement.

Mr. PAGE. Again, you are on a magnificent venture, the start of something that will hopefully bring us back into our own pride of what we actually have and can do. We are pleased to be a part of that, Mr. Chairman.

Senator MOYNIHAN. I want to ask Senator Graham to continue and we have to hear from General Kelly—but you know, we mentioned the Fermilab, which is about 50 miles from Chicago. That is about 50 miles from the squash court where in 1942, Enrico Fermi and a bunch of University of Chicago sorts, for the first time in history, produced energy that did not come from the sun. For the first time in the history of the planet, of the species, of the race—that is not just an every day event. They opened a bottle of chianti.

That is not just something that happens every day. That happens once and that is promethean, that's what it is. Fifty years later, watching other people—we have not changed in 50 years.

Senator Graham.

Senator GRAHAM. Mr. Chairman, I apologize that I am going to have to leave at 11:00 o'clock.

I am enthused and also somewhat skeptical as to the level of research funding which has been recommended. I am enthused because $10 million represents a breakthrough from what has been.

Senator MOYNIHAN. From ground zero, you might say.

Senator GRAHAM. It is an infinite breakthrough from where we were, but is it adequate for where we need to be if the Japanese are talking about spending $3 billion on this in the next seven years and we are starting at $10 million?

What is the research scheme of the Department for the decade? Where will our destination in this research be, and what role will this first increment of $10 million play toward our reaching that destination? Also, what will be the increments that you anticipate for the balance of the decade?

Ms. CHAO. In response to your question about the $10 million, those funds one split between the Corps of Engineers and the Department of Transportation. I believe that the task group is now formulating a work statement as to how to allocate this money for research and development and do determine what the framework of that analysis would be.

As we see it, that money would be used to assess the market potential, the possible returns, the likelihood of success with the technology in certain market areas, and also, to include some of the private sector parties that have expressed an interest in going into Maglev so that there can be more joint ventures with the private sector.

They are the ones who will operate the system, and they are clearly very practical, with hands-on advice. Their input is very important.

Senator GRAHAM. Is it fair to characterize the nature of the research as being essentially administrative and financial as opposed to technological?

Ms. CHAO. I think the technological aspect will be a very important part of the study.

Senator MOYNIHAN. Senator, I know your time is short. General Kelly has some very specific information on that. They do have a work schedule.

Is that not right, sir?

General KELLY. Yes, sir.

Deputy Secretary Chao alluded to the Federal Executive group, from which we have formed a technical group. What we are going to do is a pretty comprehensive plan.

We are addressing right now the fiscal year 1991 activities. We have not yet defined the program for fiscal year 1992 and beyond. That will be part of our current effort.

Basically, what we will do in fiscal year 1991, with the $10 million between DOT and us, is what Deputy Secretary Chao said, the market and financial analyses to determine the market for Maglev. More importantly, we are going to get involved in some very technical work. In effect, the majority of that money will likely end up in the technical assessment and development effort, for which will be asking universities, consulting firms, et cetera, to help us.

We will cost-share with private industry in actual concept development. We would like to see something like 3 to 6 new innovative designs in which we will leverage our Federal dollars with private sector dollars to come up, hopefully, with some interesting technical designs.

We are going to accomplish this work in a very short period of time during fiscal year 1991. The work will be finished by the following fall, at which time, we will then make an assessment commensurate with the market and financial analyses, and we will have a joint report that will be presented to Congress which lays out where we should go and what we need to do to make the jump to a new second generation U.S. Maglev system.

We have a very comprehensive, very fast-tracked program, in the next two years.

Mr. PAGE. May I say again that we have that technology here, probably the finest in the world, right here. We have to extract it.

Senator GRAHAM. Do you think that we are technologically ahead of the Japanese and the West Germans?

Mr. PAGE. There is some argument about that, but I would say that, right now, we were the recognized leader in the superconductivity field and the research that is going on at this time in U.S. labs, which would probably put us in the forefront of magnetic levitation and superconductivity.

Senator GRAHAM. If that is the case, then why was it that when this project in Central Florida was being considered and request proposals were being sought, that there were no U.S. equipment applicants? They were all either Japanese or European.

Mr. PAGE. At that time we were dealing with the technology strictly in a scientific laboratory environment. The scientists were not concerned with marketing and those kinds of areas. I cannot answer your question definitively, but I would say that technology must shift from the laboratory to the U.S. private industry. If we have the equipment, and we do, if we can produce that equipment to meet the specifications that we need, then we should restrict ourselves to U.S. equipment.

We are being underbid, undercut, underpriced.

Senator GRAHAM. I am trying to ask a prescription question, but maybe some diagnostic analysis is required first. The prescriptive question is: where do we want to be 10 years from now and what role do you see the Federal Government playing in achieving that destination, beginning with this $10 million? That is the future.

Maybe looking diagnostically to the past and repeating the question that Senator Moynihan has been asking: how is it that if we started this technology, had the basic patents and the intellectual capital to move it forward, that when we got to the point of commercial application in the nineties, we did not have any serious entities able to come forward and participate?

What happened in the past 20 years that may be instructive to what we need to be doing in the next 10 years?

Mr. PAGE. Senator, I can only say that we have for some time—and I am speaking now of the private sector—been motivated by the "Pearl Harbor Syndrome": that you do not spend money on something, you do not develop it, until it is needed. We normally do not know when it is needed. When it comes, we are too late and we are behind the power curve.

What we are trying to do—I know the Chairman is—is that we are trying now not to react but to pro-act, to look ahead. How do you encourage the private sector to do that with you? First of all, if they understand that there is a viable program there and they look to the Federal Government and understand that they have support and that there is leadership, then they will follow.

Senator MOYNIHAN. Mr. Secretary, could I ask a follow-up question to Senator Graham's question. I would ask this, as it were, to Senator Graham as well.

Has there not been a very large diversion of this kind of energy into the weapons programs in the last 30 years? Hasn't this kind of energy tended to move into Department of Defense activities?

I expect that is so. There is a guaranteed market in the Defense Department for these sorts of things. I think that the corollary is that these energies are looking for outlets now with the Pentagon, moving down. Don't you think that is a possibility?

I don't want to get the Secretary of the Army involved in talking about weapons systems. Let's talk just about bombers, B–2 bombers.

Mr. PAGE. As I understand your question, as we draw down our energies from major defense efforts, we now begin to concentrate energies in other fields, such as environment. I could answer that positively, I think, by giving you another offshoot of what this program can do.

We are great power users, tremendous fuel users. The mechanized and mobilized portions of our defense depend to a large extent upon petroleum products. Coming up in the not to distant future, we are beginning to see a shortage of that.

Senator MOYNIHAN. We are now at the point of importing half our petroleum, are we not?

Mr. PAGE. Yes, sir. As that happens, the price goes up and we become more captive of that kind of situation. There is no question that those kinds of thoughts are going through people's minds as they look to the future as to where the Army is going to go.

Maglev could be a very inspirational program, and I can tell you that the Army is delighted to be involved in this program because it may help to solve another problem that we have. That is the low utilization of fuel.

Senator MOYNIHAN. Meaning, efficient utilization?

Mr. PAGE. Yes, efficient. Maglev will give a much more efficient use. Those are things that we must look at.

I hope that answers part of your question without getting me too deeply involved in politics.

Senator MOYNIHAN. I do not want you going back and face Mr. Cheney, no.

The point you made about the Canal has to be heard. The Canal is a good piece of 19th century engineering, but the Gatun Locks and the Gaillard Cut are very vulnerable in any circumstance.

We are beginning to find that the economics of—what is it called? Double-decking?

Mr. PAGE. Yes.

Senator MOYNIHAN. You cross the continent——

Ms. CHAO. Yes, we have double-stacked trains now.

Senator MOYNIHAN [continuing]. And that is turning out to be, even with just steel on steel, an economically efficient mode, is it not?

Ms. CHAO. Yes.

Senator MOYNIHAN. If you got into this and had the superconductivity to move your power long distances from coal fields or something like that, you really have something interesting, don't you?

Mr. PAGE. You certainly do.

Senator MOYNIHAN. General Kelly, you had a statement which I wanted to hear, sir.

STATEMENT OF MAJ. GEN. PATRICK J. KELLY, DIRECTOR OF CIVIL WORKS, U.S. ARMY CORPS OF ENGINEERS

General KELLY. I will also submit a written statement for the record, Mr. Chairman.

Senator MOYNIHAN. Please do.

General KELLY. I will just summarize.

As Deputy Secretary Chao and Assistant Secretary Page have said, we are pooling our talents and resources at the Federal level for the Maglev program. As I stated earlier in response to Senator Graham's and Senator Reid's questions, we have established a very fruitful partnership with the Federal Railroad Administration, the Department of Energy, and the Environmental Protection Agency because there are certain health and environmental aspects that must be included in Maglev.

At the Federal Executive Board, the cochairmanship is split between Mr. Carmichael, who is the Administrator for FRA and myself, as the representative for the Corps of Engineers. The key to our success is teaming and effective partnership.

As Secretary Page has just said, as that of a catalyst—and this is important as I lay out this program—of bringing together the right industry players and focusing their efforts toward a common goal.

It is U.S. industry that will ultimately have to build and operate the Maglev systems in this country. It is crucial to have industry

involvement right from the start. That is why we want to leverage our money with that of private industry in the feasibility stage of that one year study in fiscal year 1991.

Toward that end, as Deputy Secretary Chao has stated, the Corps, FRA, and the Department of Energy will jointly sponsor an industry forum here in Washington in early May. The purpose of that forum is to lay out what we would like to do and to get industry ideas because a request for proposals involving a cost shared partnership will go out this summer, and we would expect to form these various teams to come in with the innovative ideas for concept designs of an American system.

This summer, both the Corps and FRA would like to issue a joint report, hopefully in the June time frame, which will lay out that whole program. This was discussed at a meeting just the other day between Mr. Carmichael and myself.

Senator MOYNIHAN. Now we are talking about June, sir.

General KELLY. June of this year.

Senator MOYNIHAN. And it is now March.

General KELLY. Yes, sir.

Senator MOYNIHAN. That's all right. You fellows have done things like that before.

General KELLY. Yes, sir, and FRA is attuned to that.

What that will do is provide a feasibility assessment of the Maglev's potential in the country and a draft implementation plan—and this is the crucial item—the draft implementation plan for a second generation U.S. system.

Contingent on the availability of future funding and authority for the Corps—as you know, Senator, we still need that authority—it is our intent to have industry develop concept designs in fiscal year 1991. That is what that $10 million plus the leveraging will do.

These will be coupled with a variety of technical and market assessments, safety, health, and environmental analyses, by the various agencies involved. We will feed that into these private industry teams during that summer.

Fiscal year 1992 represents a major decision point because it is at that time that we will provide objective information on the technical and market potential for an advanced U.S. Maglev system—that is the second generation system—and on the ability of the private sector to continue with the development of such a system and on the appropriate roles of the Federal Government and private industry.

This report in 1992 will identify the potential domestic and export markets for Maglev, assess the economic feasibility, and suggest possible sources for private sector financing. An integral part of this joint report will be the final implementation plan that will provide a detailed work plan for the development of the second generation. Hopefully, we will have stimulated competition among U.S. industry with a target goal of having an operational U.S. system by the turn of the century.

Senator MOYNIHAN. There you are. If we had talked like that in 1980, we would be riding on those today.

General KELLY. Yes, sir.

Senator MOYNIHAN. This is a very positive thing.

Could I say to Secretary Chao, go back and tell your Secretary and everybody you meet at White House receptions that this is something that can happen on Mr. Bush's watch. It is something that did not happen on those of his predecessors.

You will be able to look at this thing and touch it and get aboard it while you are still able to walk. This is something we can do in this century, and this is the moment in which it will happen or it won't happen. Because we lost the first round, there is no point in saying that we will lose them all, not at all.

Do you follow me in that?

Ms. CHAO. Yes, I do.

Senator MOYNIHAN. I don't want to seem morbid in this committee's concern about what happened, but may I say to you that if you don't get some idea about what made it impossible to do this over the last 20 years, you are likely to find that you are still working with those same inhibitions in the system and that you don't know about them.

There is something in this system, congressional and executive, that does not want to do this. Let's find out, "Why didn't it happen?"

Here in the Congress, between the Committee on Environment and Public Works and the Committee on Commerce—it's a scandal. We would rather turn out the lights and close down the country than trade jurisdiction and clarify jurisdiction on something like this issue. It's absurd, primitive behavior, but most behavior, I guess, is primitive if you look a little closer.

We are capable of doing better. Is there anything else you wanted to say?

Ms. CHAO. I just wanted a clarification, but I think that it is not really relevant at this time.

Again, I appreciate the opportunity to appear before this committee.

Senator MOYNIHAN. It is a great pleasure to have you have on this first occasion. I hope it will not be the last.

Once again, Mr. Secretary and General, we thank you for coming. Let us consider this enterprise commenced.

Ms. CHAO. Thank you very much.

Mr. PAGE. Thank you, Mr. Chairman.

General KELLY. Thank you, sir.

Senator MOYNIHAN. The record will remain open for two weeks for any questions that members may have.

We thank our recording secretary. The hearing is adjourned.

[Whereupon, at 11:14 a.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

[Statements submitted for the record and responses to additional questions follow:]

TESTIMONY OF ELAINE L. CHAO

DEPUTY SECRETARY OF TRANSPORTATION

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES, TRANSPORTATION AND INFRASTRUCTURE

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

MARCH 9, 1990

Mr. Chairman, distinguished members of the Committee, it is my privilege to appear before this Subcommittee to testify on behalf of the Department of Transportation on one of the most interesting developments in transportation in recent years -- magnetically levitated high speed ground transportation or Maglev.

America's surface transportation speed is slowing down drastically. Congestion on our highways and at our airports is constraining intercity mobility to the point that economic growth may soon be adversely affected. Present conditions bode even more serious consequences for the future. Maglev, with very safe operating speeds in excess of 300 mph, offers the potential to dramatically improve surface transportation mobility using a technology that is energy-efficient and environmentally sound.

Initial maglev systems would likely develop on a regional basis with distances up to 600 miles, absorbing excess highway and airline demand. High speed maglev systems, connecting regional airports as well as city centers, could provide an attractive alternative to short distance airline travel and could prove effective in relieving airport congestion. Regional maglev systems could ultimately expand to form a nationwide system.

There are basically two types of maglev systems being tested today. One works on the magnetic attraction principle where the vehicle underframe, which wraps around the guideway, is drawn up to within three-eights of an inch of the bottom surface of the guideway. The German Transrapid system, now nearing the end of its prototype testing, is an example of the attraction technology. The other, the Japanese Railways' prototype, works on the magnetic repulsion principle, pushing the vehicle 4-6 inches above the guideway. During the Department's period of active maglev research and development (R&D), Germany, Japan and other countries now involved in maglev research shared the products of our individual efforts. We can see the embodiment of much of America's and DOT's own R&D developments in both the German and Japanese prototypes.

Although both the German and Japanese systems are in the full scale prototype testing stage, no high speed maglev system is presently in revenue service. The Germans have approved construction of a revenue service line to connect the Bonn/Cologne and Dusseldorf airports, a distance of approximately 50 miles. The Japanese, however, have decided to undertake further prototype testing and are considering the construction of a prototype test track in the suburbs of Tokyo.

Recently, I had the opportunity to visit Emsland, West Germany, to ride the prototype Transrapid Maglev and meet with its designers. Mr. Chairman, I understand you also recently had the opportunity to ride the German Transrapid system. Next week Secretary Skinner will be traveling to Europe and will also be riding this system. I have also had the opportunity to meet with State and local officials, and private investors who want to develop maglev systems in the U.S. DOT staff have also reviewed the Japanese prototype. We have come away from those meetings believing that maglev technology has the potential to play an important role in the Nation's transportation system in this decade and throughout the 21st century.

Both the Germans and Japanese have made impressive advances in developing this technology, but I believe that there is a potential for a U.S. designed, advanced maglev system that could become the system of choice for future high speed ground transportation systems. The task before us now is to determine the appropriate role of the Federal Government in this development.

I will begin my testimony by describing the Department's role in maglev development, what we have done, what we are doing, and what we believe should be done in the future.

PAST DOT EFFORTS IN THE DEVELOPMENT OF MAGLEV

The Department's earliest involvement with maglev dates from the High Speed Ground Transportation Act. Under that Act, we funded a wide range of research into all forms of high speed ground transportation. The Department rapidly became a world leader in maglev research and along with the National Science Foundation sponsored research which produced scale model demonstrations of the maglev concept. Research by the Department lead to the development of the linear motor, the motive power used by all current maglev prototypes. In 1974, a prototype linear induction motor research vehicle set a world speed record of 255.4 m.p.h. at the Department's Test Center in Pueblo, Colorado.

In recent years, the Department has funded feasibility studies by States considering high speed ground transportation systems and has been the catalyst for many efforts to define the potential for such systems, providing both seed money and technical assistance. Prominent among these are advanced projects proposed for Florida, Texas, Ohio, California/Nevada and Pennsylvania.

Finally, enactment of the Rail Safety Improvement Act of 1988 [45 U.S.C. 431(a)], specifically made the Federal Railroad Administration (FRA) responsible for establishing and enforcing maglev safety standards.

THE CURRENT STATUS OF MAGLEV IN THE U.S.

A number of States have investigated the feasibility of high speed maglev systems, and some have concluded that private maglev systems are feasible. The Florida High Speed Rail Transportation Commission is in the second phase in its process for awarding a franchise to build and operate a maglev line between Orlando Airport and the nearby theme park area, approximately 14 miles away. This line, which could begin construction as early as next year, would employ the German technology and be financed by Japanese banks. Public and private interests in Pittsburgh recently announced plans for a detailed feasibility study of a 27 mile link between the city's downtown and its airport using Transrapid Maglev and for developing maglev manufacturing activity in the Pittsburgh area. The Transrapid Maglev is likely

to be a serious contender as the high speed ground transportation system to connect Las Vegas with the Los Angeles region.

CURRENT DOT MAGLEV-RELATED ACTIVITIES

As the agency responsible for the safety of maglev systems, the Department has initiated a major research and testing effort to ensure the safety of U.S. maglev systems. Research on the Transrapid system, the system proposed for the Florida project, is underway and is being accelerated to ensure that unresolved concerns with safety do not slow implementation. This work will evaluate the adequacy of the existing German safety standards covering this maglev system, the compliance of the system with these standards, and the need for additional standards for operation in the U.S.

FRA's initial safety research focuses on Transrapid and attractive maglev technology because it has been formally proposed for implementation in the U.S., but we also intend to cover repulsive levitation technology as represented by the Japanese design. Our first priority in these efforts is safety, and we are working with the developers of the systems to ensure that FRA safety standards and regulations are clear and timely so that they may be considered in future system design. We want safety built into the systems, not added later, as is the case with some projects.

The Department is also assisting the Florida officials and developers in exploring the environmental issues related to the proposed Florida Maglev project, and will serve as the lead agency for preparation of any Federally required environmental documentation.

The Department is exploring the use of existing transportation rights-of-way, such as the Interstate Highway System and freight rail lines. Preliminary assessments by the Federal Highway Administration have indicated that the location of maglev systems in Interstate Highway median strips may be technically feasible in certain corridors where not otherwise constrained by horizontal curvature limitations. We are continuing to explore this issue and will work with interested parties to develop mechanisms to expedite the requisite approvals where highway segments can be used in a project.

At the direction of the Congress' Appropriations Committees, FRA is studying the feasibility of commercial maglev in the U.S. That study will be completed in June 1990, and will provide an initial insight into maglev's market potential, the economic and technical feasibility of commercial maglev systems, and legislative and other institutional changes that would facilitate the development of U.S. designed and manufactured maglev systems.

Although the study is still in progress, it is clear that both current maglev systems are still in the formative stage with some bugs to be worked out, including the rather substantial capital costs. This is a natural stage for any new technology, and it offers us the opportunity to improve on the existing technology and develop the second generation of maglev in this country that would become the system of choice in the 21st century.

FUTURE DOT MAGLEV ACTIVITIES

As you are no doubt aware, the President's budget request for Fiscal Year 1991 includes a request for approximately $10 million to explore the possibility of stepped-up U.S. efforts in maglev. Building on previous R&D and results of the current feasibility study, that program is designed to determine the appropriate role for maglev in the U.S. transportation system, the economic feasibility, the appropriate safety and operating standards, and the remaining technologies that must be developed to achieve an efficient, economically sound and environmentally acceptable U.S. system. The goal of the program is to facilitate private development of an operational maglev system in the U.S. based on a domestically designed and manufactured technology.

To avoid possible duplication of efforts, Federal agencies with interests in maglev have established a mechanism to coordinate their efforts. The Federal Maglev Executive Committee, chaired

by Federal Railroad Administrator Gil Carmichael and including Tom Larson, the Federal Highway Administrator, Major General Patrick Kelly from the Corps of Engineers and J. Michael Davis, Assistant Secretary for Conservation and Renewable Energy of the Department of Energy, will set policy for this effort, which we are calling the Federal Maglev Initiative. At the working level, the Federal Maglev Coordinating Committee is directing implementation of the programs and coordinating all Federal maglev efforts. NASA, EPA, FHWA, DOE and the Department of Commerce are participating in these efforts so that we can take advantage of their specialized expertise.

The process is working well. I believe the combining of the Corps' expertise in public works with the Department's expertise in transportation and in maglev technology will lead to thorough analysis and useful recommendations on the future of maglev in the U.S. The recommendations, to be completed in early 1992, will lay out the potential for maglev and the steps by the government and the private sector necessary to realize this potential.

The group's first joint endeavor will be a Government-Industry forum on May 2 and 3 to explain the Federal Maglev Initiative, to obtain private sector input, and to begin to develop the government-industry relationships that will be necessary if this effort is to be a success. I was pleased to learn that you,

Mr. Chairman, have agreed to address this gathering. The United States has a long history of scientific and technological breakthroughs that have permitted advances in transportation worldwide. The Department's Transportation Policy Statement, which was announced by President Bush and Secretary Skinner yesterday, builds on that expertise and supports a Federal initiative to assess the possibility of such a breakthrough with maglev. The Federal Government will serve as a catalyst in the process by supporting research and development of technical issues and working to ensure that regulatory and institutional barriers do not impede implementation of cost-effective, environmentally sound transportation options like maglev.

Maglev systems offer an infrastructure alternative that is less disruptive, and possibly less expensive, than the construction of new highways or airports. These maglev systems can wear the "Made in the USA" label if we all, Federal and State Governments and the private sector, pool our efforts toward that common goal.

Mr. Chairman, this concludes my statement and I will be happy to answer any questions that the Subcommittee might have.

RESPONSES TO POST-HEARING QUESTIONS

FROM SENATOR REID

The fiscal year budget requests $6.2 million for the Federal Railroad Administration. How will this money be spent? How much do you plan to request over the next five fiscal years?

FRA's $6.15 million budget request for maglev-related activities includes $1,050,000 specifically earmarked for research into the development of U.S. maglev safety standards. The remaining $5.1 million will be used for maglev market and economic analysis and technology assessment and development; however, these funds have not been allocated to specific tasks at this time. FRA, the Corps of Engineers and other Federal agencies are coordinating Federal maglev efforts and the allocation of funding among specific areas of research will reflect this coordination.

Outyear funding requests are dependent upon the market, and economic and technology assessment efforts to be started in Fiscal Year 1990. Should there be positive results indicating the desirability of proceeding with a U.S.-developed maglev system, a complete financial plan would be developed indicating the appropriate Federal, State, and private sector financing that would be required to complete the system research and development phase and proposed installations of the U.S. technology.

You mentioned a number of agencies in addition to DOT and the Corps involved in this effort, what role will they play?

In addition to FRA and the Corps of Engineers, the following agencies have so far agreed to participate in the Federal Maglev Initiative: The Assistant Secretary of Energy for Renewable Energy, the Environmental Protection Agency, the National Aeronautics and Space Administration and the Department of Commerce. Within the Department, we also have the participation of a number of offices and agencies, for example, the Assistant Secretary of Transportation for Policy and International Affairs, the Federal Highway Administration and the Federal Aviation Administration.

The agencies will contribute their particular expertise in areas that must be evaluated if we are to fully understand the potential for maglev in the U.S. and what steps will be needed to develop an American system that can be the system of choice for future maglev technology. As examples, EPA will be assessing the impacts of electro-magnetic fields on humans and helping determine acceptable levels, while NASA will assist in evaluating the aerodynamics of vehicle designs, and the Department of Commerce will be helping assess the export market potential of maglev.

How do you characterize DOT's approach to maglev. Is it compatible with the Corps' objectives?

The Department believes that maglev has the potential for playing a significant role in our future transportation system. The question of whether U.S. industry should be involved in a major development program of our own U.S. maglev system depends on two factors:

-- the size of the market; and

-- the opportunity for U.S. industry to develop a technology which is superior in performance and/or cost.

Congress directed FRA to conduct an assessment of the current state of magnetic levitation technology, including an analysis of the economic and technical feasibility of constructing commercial maglev systems in the U.S. and the identification of legislative or other measures necessary to promote U.S. industrial leadership in maglev. The preliminary results of this assessment (which will be completed in June 1990) are positive enough to indicate the need to investigate these issues in more detail.

FRA's FY 1991 budget request will fund activities designed to expand our analysis of the market and technical issues that must be resolved before an informed decision can be made on how to proceed with maglev. This effort is being coordinated with the Corps of Engineers, and those of other Federal agencies with expertise in maglev related areas and should be viewed as a cooperative, unified and, therefore, compatible approach to maglev.

On page seven of your written testimony, you mentioned environmental documentation that needs to be completed for the Florida project. What type of documentation is this? Will similar documentation be necessary for the Las Vegas to Anaheim route? If so, will you assist with this as well?

The National Environmental Protection Act of 1969 (NEPA) requires that, before a Federal agency can undertake a major action, that agency must consider and document the likely environmental impacts of the proposed action. Although the Federal Government will not be funding the Florida project, other Federal actions may be required, such as approval by the Department of possible use of Interstate Highway rights-of-way or construction of bridges over navigable waterways, or obtaining a permit from the U.S. Army Corps of Engineers to dredge or fill wetlands. If Federal actions are required, and they can either individually or collectively be considered major, then the Federal Government has an obligation to consider the environmental consequences of the entire proposed project--not just the part requiring Federal approval. This would cover both construction and operation of the high speed rail system.

At the request of the Florida High Speed Rail Transportation Commission, the Department designated FRA to help coordinate the Commission's dealings with all Federal agencies and to serve as lead Federal agency for the preparation of any required Federal environmental documentation for both of the Florida high speed rail projects (i.e., the Miami-Orlando-Tampa steel wheel on steel rail project and the Orlando maglev project).

Federal environmental documentation may also be required for the Las Vegas to Anaheim route. As we understand the current plans, project sponsors expect to seek the Department's permission to use Interstate Highway rights-of-way, as well as to acquire rights-of-way across Federal lands controlled by the Department of Interior and/or the Department of Agriculture.

The Department is prepared to assist the California-Nevada Bi-State Superspeed Rail Transportation Commission upon request for such assistance from the Commission.

As you know, I have introduced legislation, S. 1898, the Maglev Guarantee Pilot Program Act, cosponsored by Senator Moynihan, to provide an innovative funding mechanism for maglev development. On November 14th, I asked DOT for their comments. Will they be forthcoming soon?

Senator Reid, we apologize for the delay in responding to your request for the Department's views on S. 1898. Enclosed is our views letter on S. 1898.

U.S. Department of Transportation

General Counsel

400 Seventh St. S.W.
Washington, D.C. 20590

APR 11 1990

The Honorable Harry Reid
United States Senate
Washington, DC 20510

Dear Senator Reid:

We are pleased to provide Department of Transportation comments on S.1898, a bill

> "to provide Federal Government guarantees of investments of State and local government pension funds in high-speed intercity rail facilities."

In June 1990, the Department will deliver to Congress a report on the technical and economic feasibility of constructing commercial maglev systems in the United States. As part of that report, the Department will address "legislative and other measures that could be undertaken to promote U.S. industry leadership in the production of such (maglev) equipment." Until the report is completed, we can offer only preliminary observations concerning the proposed "Maglev Guarantee Pilot Program Act."

The National Transportation Policy, unveiled by President Bush in March, encourages consideration of high speed rail and maglev systems as alternatives to expensive expansion of airports and highways. There is widespread agreement among the parties involved in these projects that private investment will be the central element in building the systems, but that a role for the Federal Government is essential in implementing these technologies in the United States. The Policy recognizes the need for the Federal Government to provide leadership in research and development to advance the technologies for deployment in the United States and to act as a catalyst to address regulatory and institutional barriers for the implementation of these systems.

S. 1898 would create a program under which the Secretary would guarantee the unpaid principal and interest of loans to high speed intercity rail facilities, including maglev, from pension funds of State and local government workers. The intent of the bill is to encourage the development of high speed ground transportation systems. While the Administration supports this goal, we have several concerns with the bill.

First, it is not clear that guaranteeing loans from state and local pension funds is an appropriate role for the Federal government to play. Second, the Federal guarantees, which could total $10 billion, would cause a large increase in the Federal government's contingent liability at a time when we are struggling to reduce this Federal liability. Another concern is that extensive Federal guarantees would negate one of the most important benefits of private sector participation, the ability to successfully assess profit potential and balance it against risks and other uncertainties.

In our view, the States, localities and the private sector will build high speed ground transportation systems of proven technologies in areas where an adequate basis for such a service exists. Florida offers an excellent example. The State recognized the need for a high speed ground system connecting three of its major urban areas--Tampa, Orlando and Miami and developed a mechanism for its financing under which a private sector developer of this system would receive certain real estate development rights that would enable the developer to capture some of the increase in real estate values resulting from the rail system. The Federal Railroad Administration's role in this project is to coordinate the requirements of the Federal agencies and to assist the State and its private partner in dealing with them. This mechanism appears to be working. The Florida High Speed Rail Corporation proposes to build a $2.45 billion system funded totally in the private sector. They do not even plan to take advantage of Federal tax free industrial revenue bonds that would be available to help fund this project.

Section 2(h)(2) imposes a "buy America" provision which requires under all circumstances that rolling stock be domestic. This provision is quite restrictive. The Bush Administration supports free trade and is working to create a "level playing field" for international business, free of such things as government incentives or subsidies that are designed to restrict imports. While the lack of American builders of rail passenger equipment is lamentable, people should buy American products because they are best, not because of some provision of law. American industry can produce the maglev system of choice worldwide if we set that as our goal and follow through. Also, we are concerned that this would foreclose the introduction of promising technology into the United States when efficiency and safety are utmost in our minds.

We regret the delay in responding to your November 1989 inquiry. The Office of Management and Budget advises that, from the standpoint of the Administration's program, there is no objection to the submission of this report.

Sincerely,

Phillip D. Brady
General Counsel

GENERAL QUESTIONS

1. Do you have any preliminary data reflecting the economic viability of maglev trains?

a. Considering only private sector involvement?

b. Considering both public and private sector involvement?

1a&b

A preliminary assessment of the economic viability of maglev will be published in the Department's report to Congress on the technical and economic feasibility of commercial maglev systems which will be delivered in June 1990. Results to date are promising, but additional analysis is necessary before drawing conclusions.

2. What is your timetable for action? When will the R&D effort begin in earnest? When will we have a working, commercial system?

#2

The FRA is planning now for contracts to be awarded in early FY 1991. These contracts will be completed by mid FY 1992, to support a decision on the opportunity for U.S. maglev initiatives and the Federal role and schedule for further development. The first operational system will be Florida's 14-mile Orlando route, using the German Transrapid technology, in 1994. A U.S. system, that is the product of a U.S. development program, could be in the final prototype testing phase in 1998. Depending on how quickly a commercial system is implemented, and whether the guideway is actually under construction before the vehicle testing is completed, we could see a U.S. system in service by the year 2000.

3. What is the purpose of this effort? To simply build a maglev train or to build a train comprised of second-generation technology, more advanced than either the Japanese or German technology?

3

The purpose of the ongoing Federal effort in maglev is to ascertain the prospects of developing a second generation maglev system more advanced than current prototypes. If such prospects are promising, then we will work to facilitate private development of such a system in the United States.

4. I assume neither the Japanese or Germans will suspend their maglev R&D efforts after they have developed working trains. Given that they are way ahead of us, can this effort you described put us on par with their technology? Can it put us ahead?

#4

We recognize that a limited window of opportunity exists to "leap frog" the existing technology. Our initial efforts in FY 1991 and early FY 1992 are designed to allow us to make that determination by mid-FY 1992.

5. How long does our country realistically have to get in the maglev race? How long until the Japanese and Germans are so far ahead, and so dominate the market, it will be impossible for the US to mount a maglev effort?

#5

Our research plans are geared to a decision point in mid-FY 1992 concerning the viability of a U.S. based second generation system. This is the earliest that a well-informed decision is possible on a major development program.

5. What legislation is required to facilitate your efforts? When is it needed?

6

The Department is already authorized by the High Speed Ground Transportation Act of 1965 to undertake the research and development and demonstration of all forms of high speed ground transportation, including maglev.

7. Will you please characterize the attitude of the OMB towards your efforts.

7

The Office of Management and Budget is supportive of the Department's efforts to identify the appropriate role for maglev in the U.S. and the measures necessary to facilitate private sector development of an American based maglev system.

8. I am concerned we may never have a nationwide maglev network because the gauge employed on the various routes will be incompatible. Are you working to establish national or international standards for maglev?

8

It is premature to establish national or international standards for maglev technology other than safety standards. Although, there may ultimately be the need for such standards, maglev technology has not yet evolved to the point that there is general acceptance of one particular technology as the best or most desirable. In fact, adoption of standards at this time could be counterproductive. There are at least two radically different maglev systems in the prototype stage today and several other less developed concepts. We need to give all these concepts a thorough evaluation. National standards would no doubt limit research to the technology that would comply with the standards at the expense of not pursuing other promising concepts. Part of the rationale behind the Federal Maglev Initiative is to identify the best means to facilitate private development of an operational maglev system in the U.S. based on a domestically designed and manufactured technology. The results of the Initiative may be the first step towards answering the questions of what is the best technology to develop in the U.S. and to what extent is standardization desirable or necessary.

9. Please give me your assesment of the Las Vegas to Los Angeles route? What role are your agencies playing in bringing this project to completion?

9

The Las Vegas to Los Angeles (or Southern California) route would be an excellent location for the first long distance maglev project between major cities. At the present time, it is also considered a candidate for high speed rail (TGV) construction. Which technology will be given the franchise will be decided in the coming months by the Nevada-California Super Speed Commission. The Federal Railroad Administration made the original grants to the City of Las Vegas to conduct a very comprehensive feasibility study of this high speed ground transportation corridor and is also in the final stages of approving a grant to assist in evaluating the franchise applications. The Department, through FRA, is willing to serve as lead Federal agency in preparing any Federal level environmental analysis that is required. Finally, depending on the specific route, FHWA may be requested to give permission for use of part of the Interstate Highway right-of-way.

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)
COMPLETE STATEMENT OF THE
HONORABLE ROBERT W. PAGE
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES, TRANSPORTATION
AND INFRASTRUCTURE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
MARCH 9, 1990

Mr. Chairman and Members of the Subcommittee, I am pleased and honored to be here today to testify on the Army Corps of Engineers program on high speed magnetically levitated transportation systems (MAGLEV). Accompanying me is Major General Patrick Kelly, Director of Civil Works of the Army Corps of Engineers.

First, I want to commend the Committee's initiative in conducting this hearing.

Magnetically levitated transportation system (MAGLEV) offers a new concept in transportation which, creatively developed, may provide the U. S. one of its best opportunities for economic expansion in the 21st century. MAGLEV could serve as a powerful new mode of U. S. transportation and as a globally marketable industry with technological spinoffs to other U. S. industries. In addition, MAGLEV holds great promise to replace a significant number of transportation vehicles in cargo and mass transportation. This would significantly reduce air emissions and perhaps reduce demands on the current transportation infrastructure. A cooperative interagency effort that is underway would utilize the extensive technical and management expertise of the Army Corps of Engineers, the Department of Transportation, and other agencies. It would

also include cooperation with and cost sharing by the private sector to further advance the principle of identifiable beneficiaries paying for public services. It would also advance public/private partnerships so necessary in today's complex world with tight budget constraints.

The FY 90 Appropriations Act provided $1 million to begin preparation of an implementation plan for a pilot research and development program for an operational U. S. MAGLEV system. The President's Budget Request for the Corps of Engineers in FY 91 includes $3.5 million for MAGLEV. We expect to submit a legislative proposal for specific MAGLEV authorization.

I am pleased that S. 2183, the proposed Water Resources Development Act of 1990, includes authorization for MAGLEV. We are currently reviewing S. 2183, and expect to submit the views of the Administration along with our own legislative proposals in the coming weeks.

There are three key points I want to make on our MAGLEV effort. First, the partnership that we have formed with the Federal Railroad Administration, the Department of Energy, and other Federal agencies is working well. At the Federal level, we are pooling our talents and resources for the MAGLEV program, and I believe this is the right response to the challenge that MAGLEV represents. It is also crucial that we develop an effective partnership with the private sector, as they are the ones who will be building and operating these systems. We want the U. S. industry involved in this program from the beginning, and we are working on several different ways, including cost sharing, to gain their full participation. Lastly, I would like to note that we will be augmenting the interagency team with a number of outside technical advisors from the

academic community, such as Dr. Paul Chu, the world-renowned expert on superconductivity from the University of Houston.

Mr. Chairman, that concludes my testimony. General Kelly will now go into detail on the specifics of the MAGLEV program.

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
COMPLETE STATEMENT OF
MAJOR GENERAL PATRICK KELLY
DIRECTOR OF CIVIL WORKS
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES, TRANSPORTATION
AND INFRASTRUCTURE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
MARCH 9, 1990

INTRODUCTION

Mr. Chairman and members of the Subcommittee, I am pleased and honored to be here today to testify on the Corps of Engineers program on high speed magnetically levitated transportation systems (MAGLEV).

I would like to begin by outlining briefly the technologies involved with MAGLEV and describing the current state of the art. I then want to share with you our thoughts on what this technology could become in the United States, and its importance to U.S. industry. Finally, I will review our progress to date this fiscal year and describe the work we have programmed in our FY 1991 budget request.

OVERVIEW OF MAGLEV TECHNOLOGY

There are two basic ways in which magnetic forces can be used to levitate a vehicle. In one arrangement, known as the electromagnetic design, conventional magnets on the vehicle are attracted upward to ferromagnetic rails located on the underside of a T-shaped guideway. This is the design which the West Germans have selected and refined for their

Transrapid system. The alternate design, known as the electrodynamic design, uses low temperature superconducting magnets on board the vehicle. Once in motion, these powerful magnets generate repulsive forces in an aluminum sheet or in passive coils in the guideway and levitate the vehicle. This is the design under development in Japan. With either design, vehicle propulsion can be achieved using a linear motor, in which a traveling magnetic wave is generated in the guideway and interacts with the vehicle to propel it along the guideway. In addition to levitation and propulsion, vehicle guidance can also be controlled by magnetic forces.

STATUS OF FOREIGN AND U.S. TECHNOLOGY

Much of the pioneering research and development on MAGLEV was done in the U.S. in the 1960's and early 1970's. Germany and Japan continued where we left off in the mid-1970's, and invested heavily with both public and private resources to develop operational MAGLEV systems. Both countries now have working prototypes that have exceeded 300 miles per hour in test runs and have safely carried passengers. West Germany has a 32-kilometer closed-loop test track at Emsland, while Japan has built a 7-kilometer test track near Miyazaki. The German Transrapid system will likely see its first commercial service in the United States. Three different localities are targeted to implement the Transrapid system in the mid-1990's. Florida is planning a 17-mile route linking the Orlando Airport with the tourist attractions along International Drive. In Pennsylvania, Pittsburgh is planning a 19-mile route between downtown and the airport, with eventual expansion into a regional network. The California-Nevada Super Speed Rail Commission is considering a MAGLEV

system to connect Southern California and Las Vegas. Various other states and regions are also exploring the potential of high speed rail and MAGLEV in the U.S. At this time, the Transrapid is the only high speed system ready for implementation in the U.S. Japan recently announced plans to construct a 43 kilometer test track in the Yamanashi prefecture, with construction and testing scheduled for completion in 1997. This line would eventually be integrated into commercial service linking Tokyo and Osaka, a distance of approximately 500 kilometers, around the turn of the century. It has also been reported that Japan is planning a revenue-producing line in Hokkaido, connecting Sapporo to the airport, a distance of 45 kilometers. Construction is slated to begin in 1991, with initiation of commercial operations as early as 1994.

MAGLEV AS A TRANSPORTATION SYSTEM

Clearly, the potential benefits of MAGLEV are massive. MAGLEV offers an advanced mode of high speed transportation capable of operating at speeds over 300 mph. Initial MAGLEV systems will likely develop on a regional basis, operating at distances up to 600 miles and absorbing some of the overload from intermediate-range airline traffic. Future MAGLEV systems could evolve into a nationwide network, allowing aircraft and automobiles to each provide the transportation services which they do best. MAGLEV will be electrically powered and thus can use any fuel or method of remote electric power generation. Since they are electrically powered, MAGLEV vehicles will be relatively quiet and pollution-free, and studies on MAGLEV test systems show this technology to be more energy efficient per passenger mile than aircraft. Because the vehicles ride on a smooth electrodynamic cushion several inches above the

guideway, MAGLEV systems should exhibit low long-term infrastructure maintenance costs. MAGLEV requires only narrow strips of land for operation and can run on elevated structures or in tunnels, as well as at ground level. Thus, MAGLEV could take advantage of existing rights-of-way along interstate highways, as well as unused railroad rights-of-way, and serve downtown metropolitan areas directly. A MAGLEV system would be capable of carrying a large volume of passenger traffic, and could also carry high-value cargo efficiently during non-peak hours of operation.

In addition, MAGLEV offers the potential to relieve several major problems related to transportation infrastructure and the environment in the United States. The first is congestion of our airspace and at major airports, a problem aggravated by the difficulty of finding open land to expand existing airports or build new airports. At best, available land is far from metropolitan centers, which leads to access problems to and from the airports. Second, air and auto transportation contribute significantly to air pollution and noise in metropolitan areas, and MAGLEV could reduce both types of pollution. Automobiles and airplanes are heavily dependent on petroleum fuel whose price and availability are susceptible to control by foreign suppliers. In some transportation markets, MAGLEV may provide increased mobility, at a lower cost than the air or automobile alternative, with minimum environmental impacts.

DEVELOPMENT OF U. S. MAGLEV TECHNOLOGY

The potential benefits from MAGLEV could be realized by importing the existing foreign MAGLEV technologies. The critical question we are concerned with is whether there are important additional benefits to be achieved by developing an advanced U.S. MAGLEV technology.

First of all, an advanced, or second-generation, U.S. MAGLEV system would be able to build on the lessons learned from our own research back in the 1960's and 1970's, from the lessons of Germany and Japan in developing their systems, and from the unique strengths of U.S. industry. In particular, U.S. industries are the world leaders in superconductivity, lightweight composite materials, computerized control systems and innovative construction techniques. These strengths should enable U.S. industry to produce a second-generation MAGLEV design that offers significant improvements over the existing foreign technologies, either in terms of better performance at a comparable cost or in terms of comparable performance at a lower cost.

The benefits of developing an advanced U.S. MAGLEV design, and the related U.S. industries to produce that design, could be significant. MAGLEV could spur development of related technologies, such as high temperature superconductivity. Spinoffs could also be expected in the electronics, materials and construction industries. Development of a U.S. MAGLEV system would provide an opportunity to the aerospace industry to redirect its resources to a new peacetime mission which would help to preserve the high-tech industrial base of the U. S. economy. An advanced MAGLEV technology could also be marketable worldwide. This potential export market, coupled with the promise of MAGLEV to reduce our dependence on imported petroleum, offers the chance to reduce our present trade deficit and to improve our competitiveness in the global marketplace.

The U. S. MAGLEV system will not be Federally owned and operated. Its success will depend ultimately on its ability to pass the market test. There is nonetheless a compelling Federal interest in creating the right

conditions to maximize the possibility for success. The program I am describing today is designed to make this happen.

PROGRESS REPORT ON FY 1990 WORK

The Corps of Engineers received an appropriation of $1 million this fiscal year to prepare an implementation plan for joint public/private sector development of a second-generation U.S. MAGLEV system. This task stems from the recommendations of the MAGLEV Technology Advisory Committee, which was organized in October 1988 at the request of Senator Moynihan. This Committee recommended a fast track effort to develop a second-generation U.S. MAGLEV system that would be demonstrated, tested and evaluated in a full-scale pilot program, with the goal being a U.S. system that would be ready for commercial implementation by the year 2000. The purpose of the Corps implementation plan is to provide a comprehensive work plan identifying the tasks, resources, and appropriate public and private sector roles required to meet that goal. We intend to complete the draft implementation plan in June of this year, and to issue it as a joint report in combination with the preliminary feasibility assessment that is being prepared by the Federal Railroad Administration (FRA).

We are also making significant progress defining the preliminary system parameters that will be used as the basis for a Request for Proposals for concept designs that we plan to issue later this year. The system parameters will also help guide the initial design effort scheduled for FY 1991. Because of the importance of adequately addressing all concerns regarding the safety of the magnetic fields associated with MAGLEV systems, we have begun discussions with the Environmental

Protection Agency (EPA) concerning this question. We anticipate making an interagency transfer of funds to EPA later this year to begin the necessary research.

However, the most significant progress I want to report to this Subcommittee concerns the formation of the Federal MAGLEV team. Beginning last fall with discussions I had with Gil Carmichael, the Administrator of the FRA, we have pulled together an effective interagency team consisting of the Corps, the FRA, the Department of Energy (DOE) and various other Federal agencies that are involved with MAGLEV. At the executive level, we have formed a MAGLEV Executive Committee with four members: myself, Mr. Carmichael, J. Michael Davis, the Assistant Secretary for Conservation and Renewable Energy in DOE, and a representative to be named from the Environmental Protection Agency. One level lower, we have formed an Interagency Coordinating Committee, which is co-chaired by the Corps and the FRA. DOE and EPA are also participants in the Coordinating Committee as are the Federal Aviation Administration, the Federal Highway Administration, the Urban Mass Transit Administration, the National Aeronautics and Space Administration and the Department of Commerce. This Committee has been meeting monthly, has formed a number of working groups, and is in the process of developing a unified Federal approach to MAGLEV. Each of the agencies involved brings a unique set of talents and resources to the table, and I am confident the combined interagency effort will be much stronger than any individual agency component. Mr. Carmichael and I are working together to share various aspects of program management. This partnership at the Federal level is working very well, and it is a success story of which we in the Corps and our sister agencies are very proud.

Even more key to the success of the program than teaming at the Federal level is the development of an effective partnership between the public and private sectors. We view the appropriate Federal role as that of a catalyst, bringing together the right industry players and focusing their efforts toward a common goal. It is U.S. industry that will ultimately have to implement MAGLEV in the United States, and it is crucial to have industry involvement from the start of the program. Toward that end, the Corps, the FRA and DOE will jointly sponsor an industry forum here in Washington, D.C., in early May of this year. This forum will provide an opportunity to explain the Federal initiative on MAGLEV in detail and to begin the dialogue with industry on how we can structure an effective partnership between the public and private sectors. Select panels at this forum will also address the technology potential to leapfrog the foreign technology, including identification of critical research and development needs, and the market potential of MAGLEV, both domestically and for export.

PROPOSED FY 1991 WORK

The President's budget request for the Corps of Engineers in FY 1991 includes $3.5 million for MAGLEV. The primary effort during FY 1991 will be the preparation of system concept designs for an advanced MAGLEV system. We anticipate awarding several competitive contracts for this concept design work early in FY 1991, with target completion by the end of the fiscal year. This effort will provide us with better information on the capability of U.S. industry to develop a second-generation MAGLEV system, on the performance characteristics of such designs, and on approximate capital and operating costs. It will also identify any major

gaps in our knowledge which will require additional R&D. This design work will be cost shared with private industry, although at this time we cannot define the mechanism or the private share with certainty. It is possible that an arrangement similar to that used for the Construction Productivity Advancement Research (CPAR) Program may be appropriate. The Corps will also continue with the necessary health and environmental analyses, in coordination with EPA and other agencies as necessary.

The President's budget request also includes $6.2 million for the Federal Railroad Administration to conduct a variety of technical and market assessments during FY 1991 and to continue their ongoing work for the safety certification of MAGLEV systems.

We intend to continue our close coordination with FRA and to fully integrate the work of our two agencies on MAGLEV, also bringing together input from other agencies including DOE, EPA and NASA.

FUTURE WORK - FY 1992 AND BEYOND

Contingent on availability of future funding and authority, it is our intent to issue a joint report with the FRA in FY 1992. This report will consolidate the information developed from the concept design, technology and market assessments, and from the safety, health and environmental analyses. FY 1992 represents a major decision point, when we will be able to provide accurate information on the technical and market potential for an advanced U.S. MAGLEV system, on the ability of the private sector to continue with development of such a system, and on the appropriate roles of the Federal government and private industry during the next phase of MAGLEV development. This report will identify the potential domestic and export markets for MAGLEV, assess the economic feasibility of such

systems and suggest possible sources for private sector financing. An integral part of this joint report will be a final implementation plan that will provide a detailed work plan for development of a second-generation system, assuming that goal to be achievable.

SUMMARY

The ultimate goal of this pilot program is to stimulate the private sector to develop an operational second-generation MAGLEV system having significant advantages over existing foreign technologies and utilizing the strengths of U.S. industry. We would like to create an atmosphere in which U.S. industry has the best possible chance to be competitive in this exciting new market.

My colleague in the Federal Railroad Administration, Gil Carmichael, refers to MAGLEV as an entirely new mode of transportation. He is right - MAGLEV is not a railroad, and it is not an airplane. It is a brand new technology that could meet many of our transportation needs in the U.S. But it also represents much more than that. We believe that it could help to revitalize U.S. industry, to regain our competitive edge and to restore U.S. technological leadership. Although it seems to be a reachable goal, developing such a advanced technology calls for a concerted, fast track effort from both Government and industry. The proposal described to you not only provides an objective assessment of MAGLEV's potential in the U.S., but also makes a concrete step toward developing a second-generation design. It is important that we begin this design effort as soon as possible, as we face a greater likelihood of falling behind Japan and West Germany without taking immediate action.

Mr. Chairman, that concludes my testimony. I would be pleased to address any questions you or other Members of the Subcommittee may have.

Senator REID
16 Mar 90
CECW-ZI (Cook)

QUESTIONS FOR THE RECORD FROM SENATOR REID
ON THE MAGNETIC LEVITATION PILOT PROGRAM

QUESTION: The FY91 budget requests $3.5 million for the Corps. How will this money be spent? How much do you plan to request over the next five years?

ANSWER: The primary focus of the Corps effort in FY91 will be on the development of concept designs for an advanced U.S. MAGLEV system. The Corps proposes to enter into cost sharing agreements with private industry to prepare several different concept designs. The development of the concept designs will continue into FY92 and, along with a variety of technical and economic assessments, will form the basis for a major decision point as to the potential for MAGLEV in this country. Cost estimates for FY92 and subsequent years will be developed during the FY90 work as part of the draft implementation plan for the MAGLEV Pilot Program. We expect to have the draft implementation plan complete by June 1990.

QUESTION: How do you characterize the Corps approach to MAGLEV? Is it compatible with DOT's objectives?

ANSWER: The Corps approach emphasizes development of a U.S. MAGLEV technology using the strengths and resources of U.S. industry. This approach is consistent with DOT's objectives of improving the Nation's transportation system, keeping the U.S. transportation industry strong and competitive and promoting development of advanced technologies to meet future transportation needs. The agencies' philosophies are also consistent on the appropriate role of the Federal government, which is to stimulate the private sector to develop, build and operate these systems. The Corps, DOT, the Department of Energy and several other Federal agencies are working together to

develop a unified Federal initiative for MAGLEV, using the talents and resources of the various agencies and also structuring an effective partnership with the private sector.

QUESTION: Is legislation needed to use the $1 million provided to the Corps by Senator Moynihan and me in the FY 90 budget?

ANSWER: The Corps will need authorizing legislation in order to proceed with detailed technical work on MAGLEV and to enter into cost-shared partnerships with private industry to develop concept designs in the FY91 and FY92 time frame. Pending passage of the legislation, the Corps is limited to accomplishing only preliminary planning and coordination efforts in preparation for this mission. The estimate for all such preliminary work in FY 90 represents approximately one-half of the FY 90 appropriation, or $500,000. The remaining amount will be allocated to initiate the detailed technical work, including contracts and interagency transfers, after the authorizing legislation in enacted.

QUESTION: What is the CPAR arrangement you mentioned on page 9 of your written testimony?

ANSWER: The CPAR (Construction Productivity Advancement Research) program is a cost-shared partnership between the Corps and the construction industry, academic institutions, state and local governments, and other groups who are interested in construction productivity and competitiveness. It was established to facilitate research, development and application of advanced construction technology through cooperative research and development efforts, licensing arrangements and other means of technology transfer. CPAR was created to help the U.S. construction industry regain its competitive edge nationally and internationally. Cost sharing terms are negotiated between an industry partner and the appropriate Corps laboratory for each

proposal. As required by law, not more than 50 percent of the cost of a CPAR project will be provided by the Corps. During FY 1989 the Corps contributed $2.7 million to the program while industry contributed over $7 million to pursue 17 different projects.

QUESTION: Do you have any preliminary data reflecting the economic viability of maglev trains?

a. Considering only private sector development?

b. Considering both public and private sector development?

ANSWER: Studies by Argonne National Laboratory indicate that MAGLEV has favorable economics when compared to other modes of high speed transportation, notably short and medium range aircraft. Three localities in the U.S. are seriously considering implementing MAGLEV during the next decade: Orlando, Florida; Pittsburgh, Pennsylvania and Southern California to Las Vegas, Nevada. The preliminary feasibility studies prepared for these corridors also indicate that MAGLEV systems should be economically feasible. Experience with the Florida project suggests that the ability to capture the increased value of real estate along the MAGLEV corridor, through special assessments by the local governments or by other mechanisms, is important in financing the capital costs of these projects. At this time, it is not known whether MAGLEV projects can be built and operated strictly with private sector financing, or whether some public sector support will be necessary. Such public sector support would need to come from the state and local governments rather than from the Federal government.

QUESTION: What is your timetable for action? When will the R&D effort begin in earnest? When will we have a working, commercial system?

ANSWER: In FY90, the Corps is preparing a draft work plan for the entire pilot program and the Department of Transportation is preparing a preliminary feasibility assessment of MAGLEV's potential in the U.S. During FY91 and FY92, the coordinated Federal effort will focus on more detailed assessments of the market and technology for MAGLEV and on developing concept designs for the second-generation system. If Congress and the Administration decide to proceed with the pilot program after FY92, then the next steps would include design, construction, testing and evaluation of a second-generation demonstration system. The goal is to have a U.S. MAGLEV system suitable for commercial implementation by the year 2000.

QUESTION: What is the purpose of this effort? To simply build a maglev train or to build a train comprised of second-generation technology, more advanced than either the Japanese or German technology?

ANSWER: The ultimate goal of the program is to stimulate the private sector to develop an operational U.S. MAGLEV system that would offer significant advantages over the foreign systems and would use the strengths of U.S. industry. A successful second-generation U.S. MAGLEV system must offer either improved performance over available foreign technologies, or similar performance at a significantly reduced cost. Recognizing that some states and regions are considering implementation of MAGLEV systems using existing technology, a near term Federal goal has also been established that would facilitate the early demonstration of such systems in the U.S. We can benefit from these early learning experiences on the way to development of an advanced U.S. MAGLEV system.

QUESTION: I assume that neither the Japanese or Germans will suspend their maglev R&D efforts after they have developed working trains. Given that they are way ahead of us, can this

effort you described put us on par with their technology? Can it put us ahead?

ANSWER: We recognize that a concerted effort will be required to develop an advanced U.S. MAGLEV system, particularly in view of the time and resources committed by West Germany and Japan. The purpose of the $3.5 million requested by the Corps for FY 1991, coupled with the $6.2 million requested by the Federal Railroad Administration, is to realistically assess the potential to leapfrog the foreign technologies, and to determine what resources would be required from the public and private sectors to achieve that goal. At this time, we do believe it is possible to develop a U.S. design, utilizing the strengths of U.S. industry in superconductivity, computerized control systems, composite materials and modular construction, which would outperform the existing foreign technologies, or to match their performance at a lower cost.

QUESTION: How long does our country realistically have to get in the maglev race? How long until the Japanese and Germans are so far ahead, and so dominate the market, it will be impossible for the U.S. to mount a maglev effort?

ANSWER: The window of opportunity for the U.S. to reap the benefits of its earlier research work and to leapfrog the foreign competition appears to be fairly small. A concentrated effort on the part of the Federal Government and U.S. private industry is required now to determine the potential of MAGLEV in the U.S. and to follow through on the development effort to ensure a competitive commercial system. It is also clear that we cannot afford to merely study the problem over the next several years, as the foreign competition will continue to move forward during that time. That is why the Corps has emphasized that we must get industry started as soon as possible on the research and development process, via the concept designs in FY91. These will be underway concurrent with the assessment process, so if the decision in FY92 is to proceed with

development of an advanced U.S. system, industry will have already made significant progress with the system designs.

QUESTION: What legislation is required to facilitate your efforts? When is it needed?

ANSWER: The Corps will need authorizing legislation in order to proceed with detailed technical work on MAGLEV and to enter into cost-shared partnerships with private industry to develop concept designs. The Administration has proposed to Congress the needed authority in the Army's FY90 legislative package. Our proposed timetable will start to fall behind schedule if the legislation is not enacted by early this summer.

QUESTION: Will you please characterize the attitude of the OMB towards your efforts.

ANSWER: All indications are that OMB recognizes the potential importance of MAGLEV and is supportive of the efforts by the Corps and DOT in FY90. The Administration's budget request for FY91 includes $3.5 million for the Corps and $6.2 million for the Federal Railroad Administration to continue our assessment and development efforts on MAGLEV. This is certainly a clear signal of OMB support for this program in the near future. Consistent with Administration policies, we anticipate that the initial MAGLEV development work will require significant cost sharing from the private sector, and that the role of the Federal government will decrease as the technology moves closer toward commercial implementation. We do not envision the Federal government building or operating these commercial systems, and the appropriate Federal role will be based on this philosophy.

QUESTION: I am concerned we may never have a nationwide maglev network because the gauge employed on the various routes

will be incompatible. Are you working to establish national of international standards for maglev?

ANSWER: A national standard for guideway design may prove to be a very important aspect of MAGLEV design if it is to evolve into a national transportation network. Results from our concept design and assessment efforts will provide useful information on possible guideway designs and on the potential and rationale for a universal guideway. It remains to be determined whether establishment of a national standard is an appropriate function of the Federal Government or of private industry.

QUESTION: Please give me your assessment of the Las Vegas to Los Angeles route? What role are your agencies playing in bringing this project to completion?

ANSWER: We would defer to the regional interests regarding the feasibility of a Las Vegas to Los Angeles route. We understand the California-Nevada Super Speed Train Commission has issued a Request for Proposals, and that potential respondents include a consortium using the German Transrapid MAGLEV technology and also another group or groups using the French TGV high speed train technology. While we believe that U.S. industry may be capable of producing a superior system, the West German Transrapid is admittedly well-refined and nearly ready for commercial implementation. We support efforts to implement MAGLEV systems in the near future, as there is much we can learn from their experiences, particularly relating to corridor selection, public acceptance and ridership, environmental impacts, real estate development and private

financing. We plan to integrate these lessons learned into our program, and as we learn more on the best technologies and markets for MAGLEV use in the United States, we will make this information available to the states and regions engaged in planning high-speed ground transportation projects. The Corps may also be able to provide certain reimbursable planning, engineering, environmental and real estate assistance to state and local governments under the Intergovernmental Cooperation Act and other authorities.

QUESTION: When you issue an RFP this summer, how will you respond to a bid from a foreign concern or a foreign concern in partnership with an American firm or an American firm owned and/or controlled by foreign interests?

ANSWER: It is difficult to fully and legally exclude foreign companies, or their U.S. subsidiaries, from participating in our collaborative research and development effort. And, as your question suggests, it is difficult in this age of international conglomerates to accurately define what we mean by a "U.S. firm" versus a "foreign firm." We do not necessarily object to foreign participation in the R&D process, as this is a means by which we can build on the experiences learned with the German and Japanese MAGLEV systems. Rather, we want to keep the knowledge learned from our R&D process, and any patents, licenses and royalties that may result from that work, in the hands of U.S. industry. We are presently exploring several different mechanisms to accomplish that goal.

In issuing an RFP, the Corps does not have authority to

limit bidders to U.S. firms. Nevertheless, we can consider whether a firm is foreign-owned or foreign-controlled in establishing the criteria we will use to evaluate the proposals submitted in response to the RFP. The evaluation critieria could rank the amount a specific proposal would contribute to the development of a U.S. MAGLEV industry. To the extent that participation of U.S. firms would enhance the development of U.S. MAGLEV industry, U.S. firms could be given preference.

If the Government does award a contract to a foreign firm, the Government may limit foreign ownership of inventions developed under the contract. The Federal Acquisition Regulation (FAR) allows for contract provisions that require the contractor to assign to the Government exclusive right, title and interests in the subject invention, or in any lesser part thereof, or provisions that require the contractor to agree it would not grant any person the exclusive right to an invention unless that person agreed that any product employing that invention would be manufactured "substantially in the U.S."

In addition, any new authorization for the Corps involvement in MAGLEV could include language stating the intent of Congress to protect the technology developed during the U.S. MAGLEV R&D effort by providing that the invention or intellectual property may not be licensed, assigned to or owned by entities that are incorporated outside of the United States.

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Wed Mar 28 14:11:28 1990

STATEMENT OF PAUL H. REISTRUP
CHAIRMAN, HIGH SPEED RAIL ASSOCIATION

before the

SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

SUBCOMMITTEE ON WATER RESOURCES,
TRANSPORTATION, AND INFRASTRUCTURE

Mr. Chairman and members of this distinguished Committee, on behalf of the High Speed Rail Association (HSRA) I am pleased to submit this statement in support of the President's program to encourage the development of magnetic levitation transportation in the United States. We are gratified by the efforts of you and your colleagues in advancing this program.

HSRA represents a strong collaboration of members of the financial community, the engineering and design profession, labor unions, the construction industry, rail equipment manufacturers and suppliers, service providers and professionals, colleges and universities, and national, state and local government units, all dedicated to advancing high speed rail passenger transportation in the United States. By "high speed rail" I include both magnetic levitation and advanced wheel on rail systems, as both technologies herald the promise of speedy, safe, reliable and comfortable surface transportation between destinations 100 to 600 miles apart. Recently, members of the aerospace community have joined our organization, highlighting HSRA's broad and expanding constituency which also includes substantial international participation.

State and regional projects across the country which offer the hope of implementing maglev technologies to improve our present congestion would benefit greatly from the federal maglev program proposed by the President. In order to maintain the long-term global competitiveness of the United States, the federal government must accelerate the pace of domestic research in maglev technology. At the same time, federal policies should encourage the immediate corridor implementation of advanced wheel on rail technologies offering the same benefits in terms of reduced congestion, increased energy conservation, and lowered pollution. Recent developments concerning a few of the leading high speed rail projects across the country now approaching the implementation stage include:

- Florida: Application of the Florida High Speed Rail Corporation for a franchise to construct an advanced wheel on rail line using ASEA Brown Boveri technology and connecting Tampa-Orlando-Miami continues under review. Franchise award is targeted for September 1991. Certification of a separate proposed Transrapid maglev demonstration in Central Florida is targeted for Fall 1990.

- Ohio: Ohio Railway Organization, Inc. to prepare, in conjunction with the Ohio High Speed Rail Authority, a construction and operation plan encompassing a specific technology and connecting Cleveland-Columbus-Cincinnati, for submission to the Governor and Assembly, 1991.

- California-Nevada: Requests for proposals for the Las Vegas-Anaheim route issued January 1990 by the California-Nevada Superspeed Train Commission. Final responses due July 1990, with a developer (either wheel on rail or maglev) to be selected by late 1990.

- Texas: The recently named Texas High Speed Rail Authority intends to issue a request for proposals in 1990 for construction of a Houston-Dallas-San Antonio "Triangle" high speed line.

High speed rail corridor initiatives elsewhere in the United States are similarly advanced. The Pennsylvania High Speed Rail Commission recently completed a study recommending a Harrisburg-Pittsburgh maglev connection. Washington State is now reviewing the possibility of a 178-mile high speed rail connection from the present Seattle/Tacoma airport to a proposed new super-airport at Moses Lake, Washington, as the basis for a new regional system in the Pacific Northwest. Studies have also been completed or are in progress for Boston-New York, Minneapolis-Milwaukee-Chicago, Detroit-Chicago, and Los Angeles-Fresno-Bay Area-Sacramento high speed systems.

Among the most encouraging of these recent developments is the proposal now pending in Central Florida to construct a maglev system between Orlando International Airport and the International Drive theme park area. If certified as expected by the end of this year, this system (which will use Transrapid maglev technology) could be operational by late 1994 as the world's first high speed maglev line in commercial service.

The recent formation of Maglev, Inc., a public/private consortium based in Pittsburgh and led by Carnegie Mellon University, is also worthy of the Subcommittee's attention. By creating a new maglev manufacturing and construction industry in Pittsburgh, Maglev, Inc. intends to revitalize the industrial infrastructure of all of Allegheny County. The initial objective

of the consortium will be to build and operate a 19-mile maglev demonstration project linking downtown Pittsburgh and the new midfield terminal being constructed at the Greater Pittsburgh airport. Maglev, Inc. is the first public/private venture in the United States dedicated to the manufacture and production of high speed maglev technology.

These nationwide efforts represent a groundswell of emerging support across the United States for high speed rail and its potential to help ease our congested air and highway transportation modes. Members of HSRA, who are actively involved in every one of these proposed projects as planners, administrators, or participants, above all recognize the alleviation of suburban and airport ground congestion, and the environmental benefits in terms of clean air and energy savings, to be gained from institution of a new, clean electrically-based system of transportation encompassing both advanced wheel on rail and maglev technologies.

It is with this perspective -- as proponents of all high speed ground transportation technologies and applications -- that HSRA supports the President's program of encouraging development of maglev technology in the United States.

HSRA also urges the Subcommittee to consider expanding the President's maglev program to include support for all intercity high speed rail facilities, regardless of origin of manufacture. HSRA recommends this approach for the following reasons:

- High speed rail is needed now to alleviate our crowded highways and airports. The President's national transportation policy recognizes the danger to our economic well-being from this congestion, and specifically recommends introduction of high speed rail to the United States as a way of keeping our transportation industry strong and competitive.

- Substantial plans for implementation of high speed rail are already underway across the country. Many of these projects, as highlighted earlier, are significantly advanced along the hard path to implementation, construction and operation. Availability of federal loan guarantees to these projects would provide the final piece to the financial puzzle that in some proposals has taken the private sector a decade to assemble.

- For every high speed rail project now under consideration, direct and indirect infrastructure costs account for approximately 80 percent of the capital investment required. High speed rail rolling stock and trainsets account for at most 20 percent of the total capital investment. Thus, the vast portion of the new economic development, construction activity, and employment generation accompanying any of the $2 to $5 billion high speed rail projects now under consideration will take place entirely in the United States. And, as the Pittsburgh initiative develops, and relationships of foreign technology suppliers with other domestic manufacturers expand, high speed intercity rail trainsets could be assembled in this country even as the domestic maglev technology manufacturing program begins to energize.

HSRA asks only for a level playing field. The highway and air modes receive substantial direct federal support not currently available to high speed rail. The President's maglev program is a vital first step in equalizing this disparity and would enable the implementation of the most suitable transportation technology in each of the various regions of this country requiring new intercity motive capacity.

Mr. Chairman, we thank you very much for providing us with the opportunity to submit this statement. HSRA would like formally to extend an invitation to you and the members of the Subcommittee to visit with us at our seventh annual international convention, to be held May 7-10, 1990 in San Antonio, Texas. Please do not hesitate to contact us if our membership can provide any and all assistance required in advancing high speed rail in the United States.